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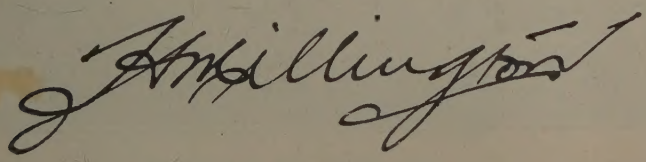
FOREWORD.

TO READERS OF THE "JOURNAL OF THE DEPARTMENT OF AGRICULTURE."

In assuming Ministerial control of the Department of Agriculture I would like to take the opportunity of assuring the many readers of the "Journal" of the deep interest I take in the work allotted to me. Moreover, I am sensible of the responsibility with which I am entrusted and its importance in relation to our production and commerce. I enter upon my duties impelled by a forceful desire to carry on the magnificent work of multiplying the products of our territory. I have watched with pleasure the rapid progress made during the past decade, and it will be my privilege and pleasure to go on ever seeking to add to our production by activity within the field of experiment and research, and to increase the store of knowledge thus acquired for the benefit of farmers in all branches of the industry.

The tradition of the Department of Agriculture is essentially that of Service, and it will be my pride, and my most earnest endeavour, to further extend the benefits of that service to all engaged in the agricultural, horticultural and pastoral pursuits of the State.

Faithfully yours,



The Minister for Agriculture,
Hon. H. Millington, M.L.A.

THE FIRST AUSTRALIAN STUDMASTER AND HIS FLOCK.

GEO. L. SUTTON,
Director of Agriculture.

About the year 1795 a young lieutenant in the New South Wales corps—John Macarthur—stationed in the infant colony of New South Wales, conceived an idea that was destined to have the most far-reaching beneficial effects upon the prosperity not only of the colony then only seven years old, but also that of the future Commonwealth of Australia. The idea, which was to prove as sound as it was deemed then to be absurd, was that the climatic and other natural conditions found in New South Wales were suitable for the production of fine wool, *i.e.*, Merino wool.

The general impression of Macarthur's contemporaries was entirely the opposite, largely in consequence of the disastrous results which had followed upon the landing of the sheep which were brought out by the first fleet in 1788. In connection with these Coghlan states:— * "Forty-four sheep were landed from the First Fleet in 1788. Sickness attacked them immediately, and they were greatly worried by the dingoes, so that at the end of three months fifteen were dead, and the mischief continued until only one was left."

Though later importations fared better, yet for probably more than a quarter of a century the general impression was that the country was better adapted for the production of mutton than for wool. It was then considered that the Merino was not hardy enough to thrive under the natural conditions, and for which the Southdown and other mutton breeds were considered more suitable, and particularly when used for crossing with the common type of ewe available, viz., the Bengal and Cape sheep, which produced such a coarse fleece that it was described at the time as "hair." As illustrating the general opinion which prevailed, it is interesting to quote from the report of Edward Wood made to Governor King on September 3rd, 1805. Edward Wood was a professional wool classer (presumably wool sorter) who had been induced by Macarthur to settle in New South Wales, and who accompanied the latter in the "Argo" from England in 1804; he had been instructed by Governor King to inspect, examine and report upon the wool of the different flocks in the colony. He states —† "It is with concern, however, that I observe this great national object (*i.e.*, the production of fine wool) may be many years retarded by an unaccountable prejudice which appears to prevail in favour of weight of carcase instead of fineness of fleece, and on this account a decided preference in favour of a cross that, I understand, has been obtained from a Southdown ram."

*(a) "Labor & Industry in Australia," Vol. 1, 1918.
(b) "Australian Merino Studs," 1904—Bruni.
†"Early Records of the Macarthurs of Camden."

Capt. John Macarthur,
The First Australian Studmaster.
(*Reproduced from "Early Records of the Macarthurs of Camden."*
By courtesy of Miss Sibella Macarthur Onslow.)

The outlook for sheep husbandry was obviously the reverse of bright when young Macarthur arrived with the second fleet in June, 1790, and apparently he did not interest himself in sheep until three or four years later. In his evidence before Commissioner Bigge in 1820 he stated—*"In the year 1794 I purchased from an officer sixty Bengal ewes and lambs, which had been imported from Calcutta, and very soon after I procured from the Captain of a transport from Ireland two Irish ewes and a young ram. The Indian sheep produced coarse hair and the wool of the Irish sheep was then valued at no more than 9d. per lb. By crossing the two breeds I had the satisfaction to see the lambs of the Indian ewes bear a mingled fleece of hair and wool—*this circumstance originated the idea of producing fine wool in* New South Wales."

Opposed as it was to the prevailing opinion of the time, the idea was extremely original, and, in view of the unpromising stock to work upon, remarkably courageous, particularly for a young man of 28. It was a conception of genius and at once stamps Macarthur as a man of broad vision. As pointed out later by his grand-daughter—Mrs. Elizabeth Macarthur Onslow—in "Some Early Records of the Macarthurs of Camden," "Although quite a young man he had the sagacity to comprehend that a petty population, established at so vast a distance from other civilised parts of the globe, could have no prospect of ultimately succeeding unless by raising as an export some raw material, which would be produced with little labour, be in considerable demand, and be capable of bearing the expense of a long sea voyage; that only by the production of some such commodity, whatever might be the natural fertility of the country, could it hope to escape the alterations of abundance and scarcity even of bread. This for a young subaltern was a bold and original view of the circumstances of the infant colony, then wholly dependent on the Mother Country even for its daily bread. He could imagine no article so completely fulfilling the necessary conditions as fine wool, and his setting earnestly to work to produce this made him an object of ridicule to his comrades, who were profiting by raising meat, and subsequently of opposition and oppression from his superiors."

Having conceived the idea of producing fine wool, it is obvious that a man of Macarthur's tenacity would immediately proceed to develop it and with determination. Consequent upon the improvement which had taken place as the result of mating the "Indian" or "hair bearing" sheep with a ram not remarkable for the quality of its wool, it is obvious that a man of Macarthur's ability would conclude that a still greater improvement would take place if rams producing finer wool were mated with the common sheep. At that time the finest wool was obtained from Spain, the produce of the Merino, the distinguishing characteristic of which was its covering of very fine wool, usually delicately crimped. It is not difficult to imagine that Macarthur, primarily with the object of improving his coarse-woolled flock, would begin immediately to plan to obtain some Merino sheep, and, if possible, in the colony. It is recorded that Major Johnson, who came out in command of the Marines in the First Fleet, brought with him a Merino ram,

*"Early Records of the Macarthurs of Camden."

for Captain Waterhouse wrote about 1806—"Major Johnson carried out a Spanish ram from England presented by the Duke of Northumberland."* This ram was, therefore, the first Merino to come to Australia; he was, however, evidently included amongst the forty-three out of the forty-four sheep which perished, for no later reference to this animal can be traced. As the desired Merinos could not be secured in New South Wales, Macarthur without doubt endeavoured to obtain them elsewhere. Obviously this was the case for we learn that in 1796, or early in 1797, when the two sloops of war, the 'Reliance' (Captain Waterhouse) and the "Supply" (Captain Kent) were ordered to the Cape of Good Hope for supplies, Macarthur entrusted the commanders Captains Waterhouse and Kent, who were friends of his, with a commission to inquire if there were any wool bearing sheep, *i.e.*, Merinos, at the Cape, and if possible secure some. On arrival at the Cape of Good Hope it was found that the widow of Colonel Gordon had some Merino sheep—presumably from Holland—for sale. These were secured. The details of their acquisition and their transport to New South Wales and disposal there can best be told in the words of Captain Waterhouse himself in what is believed to be the draft of a letter to Sir Joseph Banks, and found on the back of a letter from that gentleman to Captain Waterhouse and dated July, 1806, asking for particulars regarding the bringing of the Cape Merinos to New South Wales. He wrote—* "Having hurt my hand on the way down here is the reason I have not answered yours sooner respecting the Spanish sheep. In 1797 I arrived at the Cape of Good Hope together with the 'Supply' (Capt. Kent) and 'Britannia,' transport. On board the 'Reliance' was the Commissary for the purpose of purchasing cattle for the colony; and on board the 'Britannia' Governor King and Col. Paterson on their way to England, both of which gentlemen had been acquainted with Col. Gordon, who had lately lost his life. Col. Gordon had imported a few Spanish sheep into the Cape, which had increased to 32. Mrs. Gordon was then going to Europe, and, for some reason, did not choose to leave anything that had belonged to her late husband at the Cape. She gave three Spanish sheep to Governor King and three to Colonel Paterson; the remainder, I understood, were offered to the Commissary, but he declined to purchase them on the part of the Government. They were then offered to me. As I could not afford to purchase the whole, Captain Kent, that they might not be lost to the Colony, offered to take half. We each received 13, and I took Governor King's on board the 'Reliance.' Colonel Paterson took his to England, I understood, as a present to Sir J. Sinclair. We paid Mrs. Gordon £4 or four guineas apiece for them; the expenses on delivery were about £1 a head more. The expenses for feed on the passage were very considerable. Unfortunately Governor King's three had been brought to Cape Town before ours, and put with some others, by which they became diseased and communicated it to ours. Those three died soon after they came on board. I do not recollect the number I had alive on my arrival but I think more than half. Captain Kent, who had shared, I understood, his with Lieutenant Braithwaite, I believe lost all his from the circumstances of his applying to me for one immediately on my arrival. I do not recollect if Lieutenant Braithwaite had one or two

* Australian lean Merino Studs, 1904.—Bruni.

alive. I offered all mine to the Governor; but I suppose he was satisfied that they were in the colony, as he declined purchasing them. Captain Macarthur then offered me fifteen guineas a head if I would let him have the whole; this I declined, wishing to distribute them. I supplied Captain Kent, Captain Macarthur, Mr. Marsden and Mr. Laycock, as the Spanish ewes had lambs (none but Spanish rams running with them). I supplied Mr. Williamson, Captain Rowley, Mr. Moore, Governor, and, in fact, any person who wished to have them. I never had any other than Spanish rams with my flock; and, on my quitting the colony, I sold the flock to Mr. Cox, the paymaster, with the exception of a few to Captain Macarthur. Most persons who had Spanish sheep were particular about them, and I can assert that several of the Spanish sheep I originally brought from the Cape, together with their produce, were in the flock I left behind."

It is obvious from the concluding sentence regarding those retained by Captain Waterhouse that he had not used the Merino sheep obtained from the Cape as the nucleus of a stud flock, but like a good flock master had mated to them his sheep of Bengal and mixed origin to improve the latter.

It is also evident that the Rev. Samuel Marsden did not use the Merinos obtained from Captain Waterhouse to form a stud, but like the latter, used them with his general flock. *"He was aiming"—as stated in a report to Governor King in 1905—"to improve the constitution of the sheep, the weight of the carcases and the quality of the wool . . . . " "One true bred Spanish ram and ewe with four half-bred Southdown rams have been the sheep that have improved my flock very far beyond my expectations, in beauty, constitution, weight and fleece. As far as my own observations have gone I have always considered the pure Spanish breed much more delicate in their constitution and lighter in carcase than the produce of ewes crossed with the Spanish or half-bred Southdown rams."

Marsden's view that it was better to breed for mutton than for wool was the general view of those then interested in sheep raising in New South Wales. The flock master preferred the mixed Cape and Bengal sheep to the Merino because it bred more rapidly and had a larger carcase. Macarthur's attempt to grow fine wool was generally regarded with derision and looked upon as an amusing fad. Many laughed in their sleeves and said—† "His wits were a-woolgathering."

Learning as we do from Macarthur's subsequent actions how anxious he was to translate quickly his convictions into realities, it is easy to realise how keen he was to get all the Merino sheep secured from the Cape. This, however, was not to be; with the foresight of a far-seeing business man he prepared to make himself independent of outside sources for the material necessary to improve his flocks, and enable him to produce the fine wool for which, he believed, the natural conditions of the colony to be so specially suited.

With the intuition of the true stud master he decided to keep the Merinos separate from the other sheep and raise rams which could be used for the

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* "Labor & Industry in Australia," by Coghlan, Vol. 1.

† "Early Records of the Macarthurs of Camden."

ERRATA.

For 1905 on page 7, line 21, and on page 8, line 6, please read 1805. For 1904 on page 8, line 9, please read 1804.

improvement of his mixed flock. Thus came into being the first stud flock (in this case a Merino stud) in Australia, and Macarthur became the first stud master in Australia. There is some doubt as to whether he secured from Waterhouse four ewes and three rams or five ewes and three rams. In view of the small number landed it was probably the former.

The Lineal Descendants of the first Australian Merino Stud Flocks.
(*Reproduced from "Early Records of the Macarthurs of Camden."*
By courtesy of Miss Sibella Macarthur Onslow.)

*In 1905 there were added to the original Gordon Merinos and their descendants some Merinos which Macarthur, when in England, purchased at the sale of the surplus stock from the Royal Stud at Kew, which was held in 1904. These Merinos were the descendants of four rams and 36 ewes which, with the permission of the King of Spain, had been presented to the King of England by the Marchioness del Campo di Alange in 1791. These sheep had been selected from the Spanish flock known as "Negrette." Owing to the opposition of Sir Joseph Banks to Macarthur it was not without difficulty that these sheep—nine rams and one ewe—were allowed to leave England for Australia. Under an old unrepealed Act it was a felony to export sheep from England, and rendered those who were guilty of such an offence to dire penalties such as cutting off the right hand and branding the forehead. Fortunately, Macarthur was persistent and not easily deterred by obstacles which resulted from accident or design. He approached Lord Camden and obtained a special Treasury warrant by which the animals were allowed to leave. They were then shipped immediately in a vessel which Macarthur had very appropriately named "Argo."

* "Early Records of the Macarthurs of Camden."

In an * account of the Kew sale given in the "Agricultural Magazine," August, 1904, reference is made to eight of the sheep purchased, and of these two were said to be suffering from temporary blindness. Apparently Macarthur was so anxious and determined to obtain Merino sheep and consummate his plans to justify his views that he purchased sheep that were not in perfect health. It is believed that three rams died on the voyage and one shortly after landing. There remained *"in a very healthy state" five rams and one ewe, which were added to the little stud flock which by now was said to have increased to sixty and his mixed flock to 5,000.

It is not known from which special Spanish flock the Gordon Merinos were descended; Sir William Macarthur, son of Captain Macarthur, stated that he understood the sheep introduced from Kew to be of somewhat different type to the originals "with more dewlap and darker fleeces on the outside," very close woolled and less fine." He also stated *"There was never any other than the blood of these lots of sheep in our stud flock."

Elizabeth Farm, Parramatta,
The Home of the first Australian Merino Stud Flock.
(Reproduced from "Early Records of the Macarthurs of Camden."
By courtesy of Miss Sibella Macarthur Onslow.)

The stud flock was kept at "Elizabeth Farm" (named after his wife) until 1820, when it was transferred to Camden Park. At its maximum the stud contained about 400 ewes of the first class and about 500 of the second

* "Early Records of the Macarthurs of Camden."

class. Its subsequent history, stated by Coghlan, was—* "It was preserved at Camden Park for many years, until sheep-breeders from Victoria offered very good prices for it, and Macarthur's sons, who found that for some obscure reason the soil of the Cow pastures was not as suitable for sheep as it had been, decided to sell. Accordingly, the flock was dispersed in 1858. The value of the breed was fully recognised, and was not allowed to deteriorate. Years afterwards, William Campbell, into whose hands some of these sheep had fallen, sent a number of pure ewes and a ram to Sir William Macarthur at Camden Park, and there a small flock is still preserved in its original purity, and it is curious that it does not seem to have suffered from its prolonged in-breeding."

The foundation of the "Macarthur" stud was therefore of extreme importance, because of the influence it has had upon the building up of the pastoral industry of the Commonwealth, which to-day is the greatest of all our primary industries, and which has been the forerunner of our agricultural industry. How valuable these industries have proved may be gauged from a comparison of the wealth produced by them in 1925-26 with the total wealth produced in the Commonwealth; in that year the total production from all industries—Pastoral, Agricultural (including Dairying), Forestry, Mining, Fisheries and Manufacturing—was £430,387,000, that from the Allied Pastoral and Agricultural industries was 58 per cent. of this, viz., £249,755,000, and from the Pastoral industry alone £113,327,000, or 26 per cent.

To John Macarthur is to be given the credit of establishing the first Merino stud in Australia, and thus laying-in the foundations of the Australian wool industry, but in this honour his wife, Elizabeth Macarthur, must be associated with him. His wife had charge of his affairs, including the care and management of his flocks, during periods extending over at least 13 years. In consequence she had much, and probably most, to do with the building up of the little stud and the improvement of his larger mixed flock. The supervision and care of these sheep were entirely in her hands during his absence in England from 1801 to 1805, and later during the longer and more anxious period of his exile in England from 1809 to 1817, consequent upon the part he took in connection with the deposition of Governor Bligh. The successful development of the little stud was due, in no small measure, to the personal care and attention which she must have given to it during these periods, and especially in the early and critical years when so little was known by anyone in the colony regarding sheep husbandry.

Mrs. Macarthur was the first educated woman to come to Australia; her correspondence shows how worthily she upheld the best traditions of the British gentlewoman, and moreover how great an interest she took in her husband's affairs, and how readily and cheerfully she adapted herself to new and unfamiliar surroundings; she thus commenced to establish what is now the recognised reputation of the Australian countrywoman, and proved to be the worthy forerunner of that band of Australian pioneer women of whom all Australians have reason to be proud.

The part which the pastoral industry has taken in the development of Australia, the great wealth it has produced and is still producing, and

* "Labour and Industry in Australia," Vol. 1.

the proud position which Australia holds to-day amongst the wool producing countries of the world, supply unassailable evidence that the idea of Macarthur of producing fine wool in Australia, then represented by New South Wales, was a sound one. Each succeeding year as it speeds on will, if it be needed,

Mrs. John Macarthur,
who shares with her husband the credit of establishing the Australian Merino wool industry.

(*Reproduced from "Early Records of the Macarthurs of Camden."*
By courtesy of Miss Sibella Macarthur Onslow.)

emphasise this. So tremendously fruitful has the idea proved that in the annals of Australia the year which gave it birth—probably 1795—should be regarded as second only in importance to that, seven years previously, in which Governor Philip laid the foundations of this Commonwealth of ours.

The beginning made by Macarthur to develop his idea was a very modest one. The original animals in his stud numbered no more than eight, and probably only six, to which eight years later another six were added. Its establishment in this humble way was, however, of the greatest import. The rams from the stud and the ewes from the improved flocks, as the result of using only Merino rams in it, were distributed far and wide over the Commonwealth (including Tasmania). The result has been that in starting his stud with good sheep, and maintaining their purity as the result of freedom from outside introductions, with its corollary inbreeding, Macarthur laid the foundation from which the Australian Merino, as we know it to-day, has been built up. Subsequent events have proved this to be not only of Australian but of international moment. At that time Spain, amongst the nations, was alone in her glory as a producer of fine wool. She was, however, at the zenith of her fame, for a few years later the Peninsular war was to prove responsible for the reduction in the numbers of many, if not all, of her famous flocks, including the confiscation and destruction of some of them, and thus, like the Phoenix of old, from the ashes of the departed glory of the Spanish Merino the Australian Merino has arisen, by reason of its vaster numbers, to greater fame.

CRAB GRASS.

(*Digitaria marginata*, Link.)

W. M. CARNE, F.L.S., and C. A. GARDNER.

This grass, also known as Summer Grass, is most common as a weed of orchards, lawns, gardens and other cultivated areas, and occurs to some extent as a pasture plant in the winter swampy areas of the western coastal plain. Where stock have access to the grass during the summer they thrive upon it. The plant, however, is an annual, limited to summer growth, commencing to germinate during the early summer months and dying out with the advent of winter. If the plants are allowed to seed they reappear the following summer, the seed production being remarkably free.

Crab grass makes a very vigorous growth and is not particular as to soils, provided that it receives sufficient moisture in the early growing season. Although useful as a pasture plant it cannot be regarded as equal to Paspalum or Couch, which will usually thrive where Crab grass succeeds.

Where the grass proves a weed, care should be taken to prevent it flowering by pulling out the plants when young. It is necessary to pull the plant out by the roots, as the smallest piece of stem remaining in the soil grows again with surprising rapidity. Pulling the grass out of lawns is often a difficult process, since the runners become entangled in the lawn grass. If pulling is not resorted to the grass should be kept well mown to prevent flowering. When applying top dressing to a lawn clean sand should be used, since the grass is frequently introduced into lawns during this operation.

Crab Grass.

(*Digitaria marginata.*)

Showing habit of plant and details of spikelet.

Sand obtained from untouched land at a depth of over eighteen inches should be free from weed seeds. The danger of introducing other lawn weeds is almost inevitable if surface sand is used for top dressing.

Description of Plant.—An annual grass with stems usually creeping and rooting; leaves usually sprinkled with hairs, the ligule short and jagged; spikes digitate (finger-like) or approximate at the summit of the stem, 3-10 in number, slender and straight, 2-6 inches long; spikelets in pairs on unequal pedicels about 3 mm. long, acuminate, glabrous or pubescent, the lowest glume minute, the second three-nerved, half as long as the third which has smooth nerves.

A closely allied species (*D. sanguinalis*, Linn.) Scop., differs from D. *marginata* in very minute details which are scarcely of a specific character. The two plants are usually known under the common name of *Panicum sanguinale*.

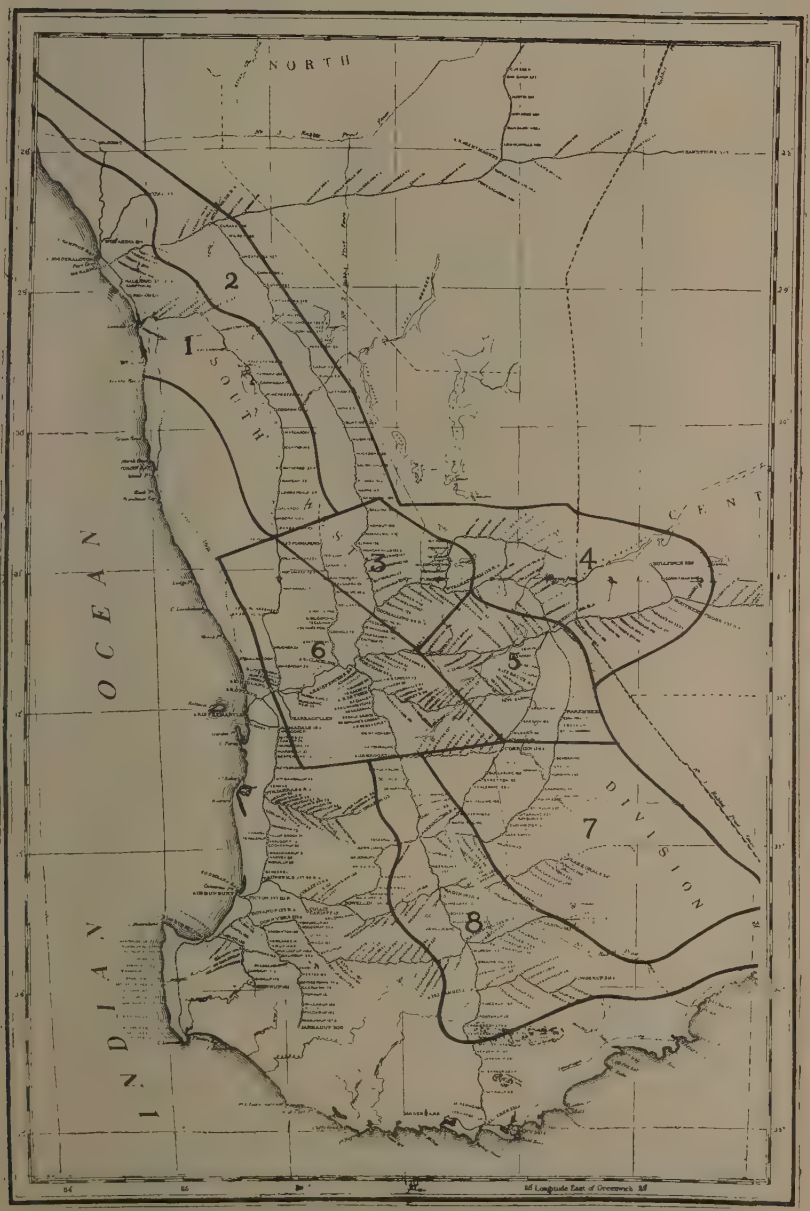
THE "ROYAL" AND DISTRICT AGRICULTURAL SOCIETIES' CROP COMPETITIONS.

I. Thomas,
Superintendent of Wheat Farms.

The Royal Agricultural Society has promoted, during the past five years, competitions for wheat crops of not less than 50 acres of any one variety amongst the district Agricultural Societies in each of the eight zones into which the Wheat Belt has been divided for the purpose of these competitions. In each of the eight zones a championship prize is awarded for the best crop, also a second prize is awarded for the runner up, those eligible for these prizes being the first and second prize winners of the competitions held by the district Agricultural Societies, provided they are held in accordance with the conditions laid down by the Royal Agricultural Society. These conditions require that the crop shall be grown on fallowed land, shall not be less than 50 acres in area of one variety and shall be judged according to the following scale of points:—

Yield	40
Freedom from weeds	20
Freedom from disease	15
Freedom from admixture	15
Evenness of growth	10
Total	100

The judges of the Royal Crop Competitions since their inception have been departmental officers attached to the Wheat Branch, and the same officers have also judged the majority of the district competitions. As it is obviously desirable that all the crops in any one zone should be inspected and the awards for the championship prizes made by the same judge, and as it is the definite and strong wish of many district societies that departmental


NORTH
2
1
SOUTH
3
4
CENT
6
5
DIVISION
7
8
INDIAN OCEAN

officers should continue to judge their competitions, the zones are arranged so that the societies which are adjacent to each other and which have similar interests and climatic conditions, are grouped together. This requires the Wheat Belt to be divided into eight zones.

The eight zones into which the Wheat Belt is divided for the purpose of the competitions are as shown on the accompanying map.

In some districts the Agricultural Societies make no provision for crop competitions, and in order to prevent farmers who live in such districts being debarred from competing for the championship prize in their zones, the Royal Agricultural Society permits such farmers to enter for the competition directly through that Society.

The reports and awards made by the respective judges in the different zones are hereunder. The points awarded for yield are not based upon the estimated yield, but upon that calculated from portions of the crop obtained from small areas taken systematically throughout the crop. These portions of the crop are threshed and the grain weighed.

ZONES 1 AND 2.

Judge: F. L. SHIER, B.Sc. (Agric.), Agricultural Adviser.

ZONE 1.

The competitors in this zone numbered six, all of which entered directly with the Royal Agricultural Society. When one considers that this zone embraces the Geraldton, Northampton, Yuna, and the districts on the Midland Railway line as far South as Moora, the number of entrants is most disappointing. This is probably due to the fact that no local Society competition is held to stimulate local interest. This is to be regretted, as the lands in these districts, combined with the climatic conditions, are capable of producing crops equal to any in the State.

The points awarded to the various competitors are shown in the table hereunder:—

TABLE 1.

ROYAL AGRICULTURAL SOCIETY.

ZONE 1.

Judge: F. L. Shier—Agricultural Adviser.

Competitor.	District.	Variety.	Yield. 40 points.	Freedom from weeds. 20 points.	Freedom from Disease. 15 points.	Freedom from Admixture. 15 points.	Evenness of Growth. 10 points.	Total. 100 points.
Bothe, B. D. ...	Coorow ...	Nabawa ...	39	15	13	14	9	90
Hebiton, J. K.	Three Springs...	Merredin ...	30	17	13	14	8	82
Morcombe, P. T.	Coorow ...	Nabawa ...	27	18	14	14	8	81
Padbury, Wm....	Three Springs...	Nabawa ...	23	19	14	13	9	78
Carter, R. and Sons	Three Springs...	Nabawa ...	25	18	13	13	8	77
Cuming Bros. ...	Carnamah ...	Yandilla King	24	18	13	13	8	76

The winning crop, that of Mr. Baxter D. Bothe, Nabawa variety, was indeed a splendid one and was calculated to yield 39 bushels per acre. It was a little on the tall side as is typical of most crops of this variety in the wetter districts, and very heavily stooled. The heads were long and well filled, having in most cases three grains across the middle spikelets. Being old land it contained small quantities of wild oats, canary grass and cockspur.

Practically no strange heads were to be found, and except for a trace of Takeall in one corner it was very free from disease. Mr. Bothe is to be congratulated on this entry as it is indeed one of the finest crops that has yet been produced in this State.

The second prize winning crop was of the Merredin variety, and was calculated to yield 30 bushels per acre, which is a very fine yield for an early variety. It was more free from weeds than the winning crop, but slightly uneven in height. No admixture was to be found, and except for a trace of loose smut it was free of disease.

Details of the methods of cultivation adopted by the various competitors are shown in the table hereunder for comparison purposes:—

TABLE 2.

Zone 1.—1927.

——	B. D. Bothe.	J. K. Hebiton.	R. Clarke and Sons.	Wm. Padbury.	P. T. Morcombe.	Cuming Bros.
Years cropped	11	6	15	...	4—1st fallow	10—1st fallow
Timber ...	Salmon Gum	York Gum and Jam	Titree, York Gum and Salmon	York Gum, Jam, and Salmon	Salmon and Gimlet	Kerosene bush and stunted Jam
Ploughed ...	Disc., July	Mouldboard, Aug.	Mouldboard, July	Disc. ploughed late Oct.	Disc. ploughed, June, July	Mouldboard, June.
Depth ...	4in.	4in.	4in.	3in.	3½in.	4in.
Other Cultivation	Tandem disced Sept. and March	Harrowed after plough, disced April	Reploughed once mould, and once undercut before Oct. Cultivated prior to drilling	Springtyned before seeding	Springtyned Sept., Oct., and again April	Springtyned August
Variety ...	Nabawa	Merredin	Nabawa	Nabawa	Nabawa	Yandilla King
Planted ...	Combined mid. May	Disc. drilled 3rd wk. May	Combined mid. May	Combined mid. May	Disc. drilled, mid. May	Disc drilled mid. April
Rate ...	60	50	60	60	52	45
Graded ...	Yes	Yes	Re-cleaned	Yes	No	Yes
Treated ...	Dry	Dry	Dry	Dry	Dry	Dry
Super. ...	93	112	65	83	90	175
Disease ...	Trace Takeall in one corner	Trace loose smut	Trace flag rust	...	Fed off 3 wks. in July	Stem rust

It is significant to note that all of the competitors used the dry copper carbonate treatment for the prevention of Ball Smut and Bunt and that in no instance was this disease to be found in any of the competition crops.

The official rainfall as recorded at Carnamah, Three Springs and Coorow is also shown:—

—	Jan.	Feb.	Mch.	Apl.	Growing Period.							Nov.	Dec.	Total for Year.
					May.	June.	July.	Aug.	Sept.	Oct.	Total.			
Carnamah	...	...	512	35	115	297	409	175	206	15	1,217	...	61	1,825
Three Springs	...	18	417	29	148	300	341	163	184	24	1,160	5	121	1,750
Coorow ...	...	...	371	47	115	362	337	221	142	21	1,198	...	...	1,616

Zone 2.

Dalwallinu Agricultural Society.

Of the sixteen entries received by the Society, ten remained for final inspection. The entry of Mr. H. E. Hamling, which was submitted, was deemed ineligible under the conditions of the Royal Agricultural Society whereby all competition areas must be on fallow.

The points awarded to the various competitors are shown in the table hereunder:—

Table 3.
DALWALLINU AGRICULTURAL SOCIETY.
Zone 2.

Competitor.	District.	Variety.	Yield. 40 points.	Freedom from weeds. 20 points.	Freedom from Disease. 15 points.	Freedom from Admixture. 15 points.	Evenness of Growth. 10 points.	Total. 100 points.
Martin, K. J. ...	Dalwallinu ...	Ford ...	30	18	14	11	8	81
Harris, Wm. ...	Dalwallinu ...	Nabawa ...	26	16	13	14	8	77
Bradford Bros	Damboring ...	Gluyas Early	23	18	13	14	8	76
Bonney, A. ...	Pithara ...	Nabawa ...	21	18	14	14	8	75
Court, A. H. ...	Courtlea ...	Nabawa ...	22	18	13	14	7	74
Jones, A. T. ...	Pithara ...	Gluyas Early	25	16	14	10	9	74
Harris, A. J., jr.	Dalwallinu ...	Merredin ...	23	16	13	12	8	72
Harris, R. W. O.	Dalwallinu ...	Nabawa ...	21	17	11	14	8	71
Swincer, W. R.	Pithara ...	Golden King	17	16	9	12	9	63
Harris, A. J., snr.	Dalwallinu ...	Gresley ...	16	14	13	11	7	61

The district suffered a dry spell during late August and early September, which had a considerable effect on the crops, particularly those grown on land which had little or no surplus moisture conserved from the previous year by good fallow.

The official rainfall as recorded at Dalwallinu for 1927 is:—

—	Jan.	Feb.	Mch.	Apl.	Growing Period. May.	June.	July.	Aug.	Sept.	Oct.	Total.	Nov.	Dec.	Total for year.
Dalwallinu	39	...	361	60	82	282	300	134	62	44	904	13	...	1,377

A noticeable feature in this district is the general absence of sheep, only three of the competitors using them to any extent. This is to be deplored, particularly in a district where the majority of the farmers are well established. The benefits of sheep on the wheat farm have been stressed continuously. They keep the fallows clean of weeds, which not only rob the soil of moisture, but in many instances form host plants to harbour diseases over to the next wheat crop: for example, Barley Grass and Take-all. Sheep also compact the soil, which is no small factor in the preparation of a good seed bed for a wheat crop. This is a condition which is very hard to obtain in Morrell type soils, which are fairly plentiful around Dalwallinu. In fact, many fallows have been ruined by too frequent cultivations for the destruction of weeds during the summer months when the soil is in a dry state.

Without sheep, stubble generally becomes a hindrance to farming operations in the drier areas. It keeps the soil too open and allows valuable moisture to escape, and, above all, prevents the consolidation of the sub-surface soil, one of the essential factors for the success of fallow. With sheep, the stubble is more easily changed to humus, thereby improving the physical condition of the soil and greatly adding to the nitrogen supply to the plant.

Sheep, in addition to being beneficial to the fallowed land, also increase the annual monetary return of the farmer, and with two sources of income a failure in one does not mean a failure altogether.

Six of the competitors treated their seed by the dry method for the prevention of Ball Smut, while three planted seed from a clean crop, the seed of which had been dry treated the previous year. Where clean crops are being obtained, this practice of treating the seed every alternate year is quite satisfactory. One competitor used the wet method, but ball smut was found in large quantities. Evidently the treatment was not carried out correctly, as this method, although not so convenient or easy as the dry copper carbonate, has proved its efficiency beyond dispute.

The winning crop of Mr. K. J. Martin was of the variety "Ford," and was calculated to yield 30 bushels per acre. It was well stooled and of a nice stripping height. It was very free from disease and the only weeds were a little wild oats and cockspur. However, far too many strange heads were present. Sheep were pastured on the fallow and before ploughing. This to a great extent was, no doubt, one of the factors in the production of this high yielding crop on Morrell and Salmon Gum land, which was free from weeds and had previously produced ten crops.

The crop gaining second prize was of the Nabawa variety and was calculated to yield 26 bushels per acre. It was of a nice height and evenly stooled. Very few strange heads were present but there was a fair percentage of Mustard, Barley Grass, Wild Oats and Cockspur. Flag Rust was the only disease noticed.

Below is a table showing details of the methods employed by the various competitors:—

TABLE 4.—DALWALLINU DISTRICT CROP COMPETITION.—ZONE 2.

——	Martin, K. J.	Harris, W. M.	Bradford Bros.	Bonney, A.	Court, A. H.
Years cropped	10. Sheep on fallow and before plough	6	6, 2 fallows, sheep pastured	7, first fallow	4th, 2 fallows
Timber ...	Salmon and Morrell	Salmon and Gimlet	Salmon and Morrell	Salmon, Jam and Gimlet	Morrell, principally Salmon, Gimlet, and Ti-tree
Ploughed ...	Mid. June	Mouldboard, July	Disc, July	Mouldboard, early July	Mouldboard, early July
Depth ...	4in.	4in.	4in.	4in.	4½in.
Other cultivations	Springtyned, Sept., harrowed and cultivated March	Springtyned, Sept., Feb. and March	Sundercut, Sept. and April	Springtyned, Sept., sundercut March	Springtyned, Oct. Harrowed March
Variety ...	Ford	Nabawa	Gluyas Early	Nabawa	Nabawa
Planted ...	Combine, 3rd week April	Combine, mid. May	Combine, 1st week May	Disc, Drilled 1st week May	Disc drilled 1st week May
Rate	50lbs.	48lbs.	55lbs.	45lbs.	60lbs.
Graded ...	Yes	Yes	Yes	Yes	Recleaned
Treated ...	Dry	No. Dry previous year	Dry	Dry	Dry
Super. ...	60lbs.	90lbs.	90lbs.	100lbs.	34lbs.*
Disease	...	Trace Flag Rust	...	...	...

* Error in cogs.

DALWALLINU DISTRICT CROP COMPETITION—*continued.*

	Jones, A. T.	Harris, A. J., Jnr.	Harris, R. W. O.	Swincer, W. R.	Harris, A. J., Snr.
Years cropped	12	4. 2 fallows. No. sheep	5 crops, 2 or 3 fallows, no sheep	6. No sheep	12. No sheep
Timber ...	Salmon, Gimlet and Ti-tree	Salmon, Gimlet, Jam, York Gum	Salmon, Gimlet	Salmon and Gimlet	Gimlet, Salmon and Morrell
Ploughed ...	Disc., July	Mouldboard, July and Aug.	Mouldboard, July	Disc., end July	Disc., July and August
Depth ...	4in.	4in.	4in.	3½in.	4in.
Other cultivations	Disced Sept. Springtooth Oct., and again before seeding	Sundercut Nov. Springtyne March	Springtyned, Sept., Oct., Mar., and before seeding	Worked three times Springtyne	Sundercut Oct. and before seeding
Variety ...	Gluyas Early	Merredin	Nabawa	Golden King	Gresley
Planted ...	Disc. drilled mid. May	Combine end of May	Combine mid. May	Disc drilled mid. May	Disc drilled mid. May
Rate	60lbs.	57lbs.	55lbs.	45lbs.	58lbs.
Graded ...	Recleaned	Yes	Recleaned	No	Yes
Treated	Dry	Dry	No. Previous year	Wet	No. Previous year
Super. ...	75lbs.	70lbs.	70lbs.	60lbs.	80lbs.
Disease ...	...	Loose Smut	Takeall and loose smut	Ball smut and Flag Smut bad, some Takeall	Stem rust and loose smut

ZONE 3.

Judge: J. LANGFIELD, Manager, Merredin Experiment Farm.

Entries for this zone were received from the Dowerin, Wongan Hills, and Wyalkatchem Agricultural Societies.

Dowerin Agricultural Society.

In the Dowerin Agricultural Society's competition, seven competitors submitted crops for inspection.

The points awarded are set out hereunder:—

TABLE 5.
DOWERIN AGRICULTURAL SOCIETY.
Judge: J. H. Langfield—Manager, Merredin Experiment Farm.

Competitor.	District.	Variety.	Yield, 40 points.	Freedom from Weeds, 20 points.	Freedom from Disease, 15 points.	Freedom from Admixture, 15 points.	Evenness of Growth, 10 points.	Total, 100 points.
Bear, H. E. ...	Minnivale ...	Gluyas Early	28	18	14	13	9	82
Cosh, E. C. ...	Minnivale ...	Gluyas Early	26	19	14	14	8	81
Hughes, J. R. ...	Minnivale ...	Nabawa ...	26	18	14	14	8	80
Riley, R. R. ...	Minnivale ...	Merredin ...	28	17	13	13	8	79
Jones, A. ...	Dowerin ...	Nabawa ...	25	17	14	14	8	78
Harris, W. V. ...	Minnivale ...	Nabawa ...	22	19	14	14	8	77
O'Loughlin, M. J.	Minnivale ...	Merredin ...	20	17	12	14	8	71

The winning crop—that of Mr. H. E. Bear—was planted with the variety Gluyas Early during the third week in May at the rate of 50lbs. of recleaned seed per acre. Superphosphate was applied at the rate of 80lbs. per acre. This crop was closely followed by several, all giving promise of fair yields.

A little flag smut was noticed, and on two crops ball smut had appeared. Odd patches of take-all were also found. Taken generally, the crops were comparatively free of weed growth and admixture.

The rainfall, as officially recorded at Dowerin, was:—

——	Jan.	Feb.	Mch.	Apl.	Growing Period.							Nov.	Dec.	Total. for year.
					May.	June.	July.	Aug.	Sept.	Oct.	Total.			
Dowerin	...	7	425	28	119	297	260	144	97	104	1,021	60	8	1,549

The details of the cropping are as hereunder:—

TABLE 6.

DOWERIN DISTRICT CROP COMPETITION.

ZONE 3.

Competitor.	H. E. Bear.	Cosh, E. C.	Hughes, J. R.	Riley, R.P.
Years cropped ...	14	17	6	17
Timber	Salmon Gum	Salmon and Gimlet	Gimlet and Salmon	Gimlet and Salmon
Ploughed	July	July	July	June
Depth	4in.	4in.	4in.	4in.
Condition	Good	Good	Good	Good
Cultivations ...	Sundercut Sept., and then harrowed. Cultivated in March, and sown with Combine	Skim ploughed and Springtoothed in Spring. Cultivated. Springtoothed and then sown by Combine	Sundercut in Spring, again April and sown with Combine	Cultivated Sept., again Mar. with Sundercut. Cultivated, Springtyne and sown with Combine
Variety	Gluyas Early	Gluyas Early	Nabawa	Merredin
Pickled	Dry	Dry	Dry	Dry
Date Planted ...	3rd week May	10th May	Mid. May	22nd May
Seed per acre ...	50lbs.	45lbs.	50lbs.	48lbs.
Graded	Winnowed	Winnowed	Yes	Yes
Rate of Super. ...	80lbs.	100lbs.	100lbs.	90lbs.

Competitor.	Jones, A.	Harris, W. V.	O'Loughlin, M. J.
Years cropped ...	15	2	17
Timber	Salmon and Gimlet	Scrub Plain	Gimlet and Salmon
Ploughed	July	October	July
Depth	4in.	4in.	3in.
Condition	Good	Dry	Hard
Cultivations ...	Cultivated in Spring and before seeding sown with Combine	Sundercut before drill	Cultivated in Spring and disced before seeding sown with Combine
Variety	Nabawa	Nabawa	Merredin
Pickled	Dry	Dry	Wet
Date Planted ...	Mid. May	20th April	1st June
Seed per acre ...	45lbs.	50lbs.	70lbs.
Graded	Yes	Winnowed	Winnowed
Rate of Super. ...	140lbs.	112lbs.	90lbs.

Wyalkatchem Agricultural Society.

Of the nineteen entries in the competition of the above Society five were withdrawn. It is to be regretted that no notifications were received until the farms were visited, as much unnecessary travelling could have been avoided.

The points awarded are set out in the table hereunder:—

TABLE 7.
WYALKATCHEM AGRICULTURAL SOCIETY.
ZONE 3.
Judge: J. H. LANGFIELD—Manager, Experiment Farm, Merredin.

Competitor.	District.	Variety.	Yield, 40 points.	Freedom from Weeds, 20 points.	Freedom from Disease, 15 points.	Freedom from Admixture, 15 points.	Evenness of Growth, 10 points.	Total, 100 points.
Threlfall, C. ...	Korrelocking ...	Nabawa ...	34	19	14	14	9	90
Ferries, H. G. ...	Wyalkatchem...	Nabawa ...	32	19	14	13	8	86
Lindsay, J. ...	Wyalkatchem...	Nabawa ...	31	18	14	14	8	85
Payne, Mrs. ...	Korrelocking ...	Merredin ...	31	18	14	13	8	84
Lehman, C. E....	Wyalkatchem...	Nabawa ...	28	18	14	13	8	81
Smith, P. H. ...	Yorkrakine ...	Gluyas Early	28	18	13	13	8	80
Jones, W. W. ...	Cowcowing ...	Nabawa ...	26	19	14	12	8	79
Riches, G. ...	Wyalkatchem	Nabawa ...	26	18	13	14	8	79
Davies, W. H. ...	Yorkrakine ...	Nabawa ...	26	18	14	14	7	79
Diver, T. E. ...	Yorkrakine ...	Nabawa ...	26	17	12	13	8	76
Bowles, J. ...	Wyalkatchem...	Nabawa ...	25	16	13	14	7	75
Vernon, Mrs. M.	Korrelocking ...	Gresley ...	24	17	13	12	8	74
Hall, L. ...	Cowcowing ...	Nabawa ...	24	15	14	13	7	73
O'Loughlin, M. J.	Minnivale ...	Merredin ...	20	17	12	14	8	71

The winning crop was part of 70 acres of the variety Nabawa. It was very attractive in appearance, being even in height with little or no weeds, admixture, or disease.

Following the winning crop, that of Mr. G. Threlfall, there were several excellent crops, there being very little difference in the awards made. Those of Messrs. H. G. Ferries and J. Lindsay and Mrs. Payne were all of a high standard. Most of the remaining crops, as indicated by the awards, although not so good were also creditable.

Of the fourteen crops inspected, ten were of the variety Nabawa, two Merredin, and one each of Gluyas Early and Gresley. It is noteworthy that whereas twelve of the fourteen competitors used the dry and two the wet method when treating their seed for the prevention of the disease smut, the only ball smut found was in one of the crops sown with wet pickled seed. Both methods are so reliable that the presence of disease in this case cannot be due to the method of treatment but rather to the manner in which it is applied.

Small patches of take-all were also found in most of the crops. Flag smut was noticed in the varieties Gluyas Early, Gresley, and Merredin.

The rainfall, as officially recorded at Wyalkatchem, Korrelocking and Cowcowing, was:—

——	Jan.	Feb.	Mch.	Apl.	Growing Period.							Nov.	Dec.	Total for year.
					May.	June.	July.	Aug.	Sept.	Oct.	Total.			
Wyalkatchem	6	12	596	28	99	220	210	106	175	87	897	41	23	1,603
Korrelocking	...	72	609	28	80	194	215	114	118	94	815	26	7	1,49
Cowcowing	...	...	671	13	87	210	212	107	113	95	824	3	10	1,52

The cropping details are set out in the table hereunder:—

TABLE 8.

WYALKATCHEM DISTRICT CROP COMPETITION.

ZONE 3.

Competitor.	Threlfall, G.	Ferries, H. G.	Lindsay, J.	Payne, Mrs.	Lehman, C. E.
Years cropped	18	17	...	20	15
Timber ...	Salmon, Gimlet and Mallee	Gimlet	...	Gimlet and Salmon	Gimlet, Mallee, and a bit of Morrell
Ploughed ...	Early June	June	...	June	June
Depth ...	4in.	3½in.	...	3in. and 4in.	4in.
Condition ...	Good	Good	...	Good	Good
Cultivations ...	Springtyne in July. Duckfoot in Oct. 3 times in March sown with Combine	Sundercut Sep. Again in Oct., again in Mar. sown with Disc Drill	...	Cultivated Sept. and sown with Combine	Cultivated Aug. and harrowed. Cultivated and harrowed before sowing. Sown with Combine
Variety ...	Nabawa	Nabawa	Nabawa	Merredin	Nabawa
Pickled ...	Dry	Dry	...	Dry	Dry
Date planted...	1st week May	End of April	...	1st week May	Mid. May
Rate of Seed	45lbs.	50lbs.	...	60lbs.	47lbs.
Graded ...	Yes	Yes	...	Yes	Yes
Rate of Super.	90lbs.	90lbs.	...	90lbs.	70lbs.

Competitor.	Smith, P. H.	Jones, W. W.	Riches, G	Davies, W. H.	Diver, T. E.
Years cropped	5	3	10	Part 12 years ; part 3 years	4
Timber ...	Salmon, Mallee and Morrell	Gimlet and Salmon	Gimlet and Salmon	Gimlet and Mallee	Gimlet
Ploughed ...	August	August	End June and early July	July	August
Depth ...	4in.	3in. to 4in.	3in. to 4in.	3½in. to 4in.	4in.
Condition ...	Good	Good	Good	Good	Hard
Cultivations ...	In Sept., then after March rain, Sundercut and sown with Combine	Cultivated and drilled	Sundercut Spring, sundercut and skim in Autumn. sundercut and sown with disc drill	Sundercut Sep. sundercut before seeding and sown with Combine	Suntyned and harrowed and sown with Combine
Variety ...	Gluyas Early	Nabawa	Nabawa	Nabawa	Nabawa
Pickled ...	Dry	Dry	Dry	Dry	Dry
Date planted	2nd week May	Mid. April	Early May	1st week May	3rd week May
Rate of Seed	64lbs.	45lbs.	43lbs.	54lbs.	50lbs.
Graded ...	Yes	Yes	Yes	Winnowed	Winnowed
Rate of Super.	60lbs.	70lbs.	90lbs.	90lbs.	60lbs.

WYALKATCHEM DISTRICT CROP COMPETITION—*continued*.

ZONE 3.

Competitor.	Bowles, J.	Vernon, Mrs.	Hall, L.	O'Loughlin, M. J.
Years cropped	16	14	16	17
Timber ...	Gimlet, Salmon and Mallee	Gimlet and Salmon	Gimlet and Salmon	Gimlet and Salmon
Ploughed ...	July	September	June to August	July
Depth ...	4in.	4in.	6in.	3in.
Condit ...	Half good, balance dry	Good	Good	Hard
Cultivations ...	Cultivated Spring and twice in Autumn. Sown with Combine	Cultivated in April Sown with Combine	Sundercut Sept. again before planting	Cultivated in Spring Disced before seeding. Sown with Combine
Variety ...	Nabawa	Gresley	Nabawa	Merredin
Pickled ...	Wet	Dry	Dry	Wet
Date planted	2nd week May	Mid. May	End of April	1st week June
Rate of Seed	60lbs.	58lbs.	45lbs.	70lbs.
Graded ...	Yes	Yes	Yes	Winnowed
Rate of Super.	90lbs.	90lbs.	75lbs.	90lbs.

Wongan Hills Agricultural Society.

Of the five entries in this Society's competition, two were withdrawn. The points awarded are as hereunder:—

TABLE 9.

WONGAN HILLS AGRICULTURAL SOCIETY.

ZONE 3.

Judge: J. H. LANGFIELD—Manager, Merredin Experiment Farm.

Competitor.	District.	Variety.	Yield. 40 points.	Freedom from weeds. 20 points.	Freedom from Disease. 15 points.	Freedom from Admixture. 15 points.	Evenness of Growth. 10 points.	Total. 100 points.
Parker, A. E. ...	Wongan Hills...	Nabawa ...	30	17	14	14	8	83
Ackland, J. H....	Wongan Hills...	Nabawa ...	28	17	13	14	8	80
Parker, C. E. ...	Wongan Hills...	Nabawa ...	21	17	14	14	8	74

The winning crop was 50 acres of the variety Nabawa, entered by Mr. A. E. Parker. This was sown during the end of April and the beginning of May at the rate of 52lbs. of graded seed per acre, superphosphate being applied at the rate of 83lbs. per acre. The crop was very even in height and well developed, being calculated to yield 30 bushels per acre. Little admixture was noticed.

Mr. J. H. Ackland's crop, also of the variety Nabawa, secured second place. The rate of seed sown was 55lbs. per acre, and the application of superphosphate was 112lbs. per acre. Although free from other disease, this crop had several bad patches of take-all.

The rainfall, as officially recorded at Wongan Hills, was:—

——	Jan.	Feb.	Mch.	Apl.	Growing Period.							Nov.	Dec.	Total for year.
					May.	June.	July.	Aug.	Sept.	Oct.	Total.			
Wongan Hills	...	4	309	38	118	285	241	109	71	39	863	4	2	1,220

The details of the cropping of the competitors are as hereunder:—

TABLE 10.

Competitor.	Parker, A. E.	Ackland, J. H.	Parker, C.
Years cropped ...	5	15	...
Timber	Salmon and Gimlet	Salmon, Gimlet and Titree	Salmon and Gimlet
Ploughed	June	July	July
Type of Plough ...	...	...	...
Depth	3in.	3½in. to 4in.	3½in. to 4in.
Condition of land at time of ploughing	Good	Good	Good
Other cultivations	Twice in Spring and once before seeding. Drilled with Combine	Sundercut and Springtyned in Spring. Harrowed March, then cultivated and sown with Combine	Cultivated in Spring, after March rains, and drilled with Combine
Variety	Nabawa	Nabawa	Nabawa
Planted	End of April and early May	Last week April	May
Rate of Seed ...	52lbs.	55lbs.	58lbs.
Graded	Yes	Yes	Yes
Treated	Yes (dry)	Yes (dry)	Yes (dry)
Rate of Super. ...	83lbs.	112lbs.	90lbs.
Disease	...	...	...

ZONE 5.

Judge : I. THOMAS, Superintendent of Wheat Farms.

Three District Agricultural Societies, viz., Merredin, Bruce Rock and Baandee-Doodlakine, together with two entries received direct by the Royal Agricultural Society, were represented in this zone competition.

The total number of entries received was 52, of which 14 were from Merredin, 30 from Bruce Rock, and 6 from Baandee-Doodlakine. Of the remaining two, one was from Kellerberrin and the other Tammin.

Owing to the withdrawal of 24 entries, there remained 28 for inspection. Although all withdrawals cannot, of course, be avoided, it is to be regretted that the number in this instance was so large. It was very gratifying, however, that notification, in almost every case, was received by the secretary prior to the Judge's visit. It is to be hoped that this practice will continue, thus avoiding unnecessary travelling and delay at a period when the Judge's time is so limited.

Merredin Agricultural Society.

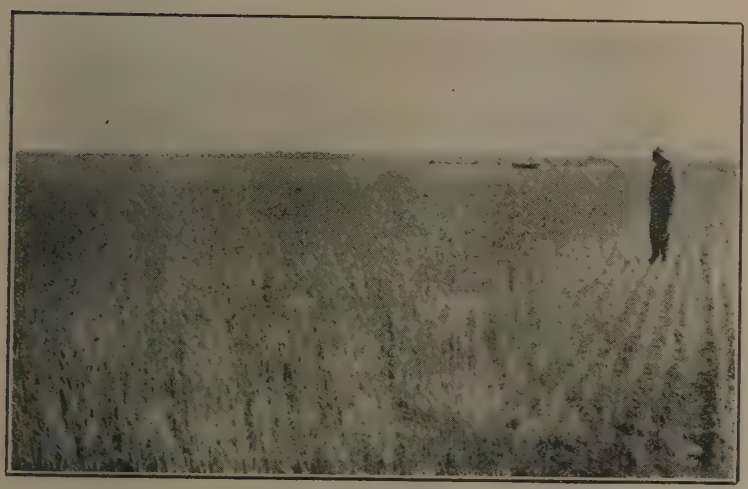
Of 14 entries received, 11 submitted their crops for inspection. The resulting awards are set out in the table hereunder:—

TABLE 11.—MERREDIN AGRICULTURAL SOCIETY.—ZONE 5.
Judge: I. THOMAS—Superintendent of Wheat Farms.

Competitor.	District.	Variety.	Yield. 40 points.	Freedom from weeds. 20 points.	Freedom from Disease. 15 points.	Freedom from Admixture. 15 points.	Evenness of Growth. 10 points.	Total. 100 points
Rowan, C. ...	Korbel... ...	Nabawa ...	34	17	13	13	8	85
Pollock, R. ...	Korbel... ...	Nabawa ...	32	17	13	13	9	84
Teasdale Bros....	Belka	Merredin ...	29	17	13	14	9	82
Dumsday, L. ...	Goomarin ...	Nabawa ...	28	13	13	14	8	81
Parsons, F. ...	Korbel... ...	Nabawa ...	26	18	13	13	8	78
Teasdale. H. W.	Merredin ...	Newman's Early	26	16	13	12	9	76
Robartson Bros.	Nangeenan ...	Newman's Early	23	16	12	13	7	71
Teasdale, F. O.	Korbel... ...	Bald Early...	24	14	12	13	7	70
Clark, F. J. ...	Belka	Nabawa ...	22	15	12	13	6	68
Clothier, J. ...	Merredin ...	Newman's Early	19	16	13	13	7	68
Maughan Bros.	Nukarni ...	Nabawa ...	22	15	11	13	7	68

Clive H. Rowan's winning crop of "Nabawa."

Dumsday's competition crop, "Nabawa" (Goomarin).



R. Pollock's 50 acres (Korbel).

The winning crop was part of 190 acres of Nabawa. It was slightly irregular in stooling owing to small patches of varying soil. The heads were well filled. Very few weeds and practically no admixture were noticed, and ball smut and stem rust were present to but a slight degree. This competing crop was not so attractive as others in the competition, but nevertheless it had the appearance of being a heavy yielder.

The crop awarded second prize was also of the variety Nabawa, the major portion being the competitor's stud plot, the balance of the required area being bulk crop.

Although well grown and more regular in height and stooling, it did not have the appearance of yielding as well as the winning crop. It was fairly free from weeds and disease, of the latter only a slight infection of take-all being in evidence. The bulk crop portion contained a little barley, otherwise it was free from admixture.

One of the most attractive crops in this competition was that of Messrs. Teasdale Bros. of Belka. It was of the variety Merredin and, except for the effect of a sand drift which encroached on one side, was of very regular height and stooling, thus giving indications that thorough and uniform preparation had been given to the land.

The rainfall, as recorded at Merredin, was:—

	Jan.	Feb.	Mch.	Apl.	Growing Period.							Nov.	Dec.	Total for year.
					May.	June.	July.	Aug.	Sept.	Oct.	Total.			
Merredin	25	5	634	47	58	192	161	118	266	67	862	22	67	1,662

The methods of cultivation adopted by the competitors are set out hereunder:—

MERREDIN DISTRICT CROP COMPETITION.
ZONE 5.

Competitor.	Rowan, C.	Pollock, R.	Teasdale Bros.	Dumsday, L.
Years cropped	5	5	At least 8	7
Timber ...	Salmon, Gimlet and a little Ti-tree.	Salmon and Gimlet	Salmon and Gimlet	Salmon and Gimlet
Ploughed ...	June	June and July	June	July
Type of Plough	Mouldboard	Mouldboard	Mouldboard	Heavy Disc
Depth ...	3½in.	4½in.	3in.	3in.
Condition of land at time of ploughing	Good	Good	Good	Good
Other cultivations	Duckfoot cultivated Aug. and Sept. and again in April and May. Harrowed behind scarifier before seeding	Crossed with Sundercut in Sept. Springtyned after rain in Feb., and again before seeding	Disced in Sept. Springtyned in Oct., in April after rain, and again prior to seeding	Broad tyne spring cultivated in Sept. and Mar. Drilled with Combine
Variety ...	Nabawa	Nabawa	Merredin	Nabawa
Planted ...	3rd week May	2nd week May	2nd week May	3rd and 4th week in April
Rate of Seed	50lbs.	45lbs.	45lbs.	45lbs.
Graded ...	Yes	Yes	Yes	Yes
Treated ...	No	Yes (dry)	No	Yes (dry)
Rate of Super.	100lbs.	90lbs.	94lbs.	100lbs.
Disease ...	Almost free ...	Slight trace of Take-all	Flag Smut and trace of Rust	Trace of foot-rot and Rust

MERREDIN DISTRICT CROP COMPETITION—*continued*.

ZONE 5.

Competitor.	Parsons, T. G.	Teasdale, H. W.	Robartson.	Teasdale, F. O.
Years cropped	3	6	Old land	11
Timber ...	Salmon and Gimlet running to Mallee	Salmon and Gimlet	Mostly Gimlet	Gimlet
Ploughed ...	July	July	June	June
Type of Plough	Mouldboard	Disc Cultivator	Mouldboard and Disc	Mouldboard
Depth ...	4in.	3½in.	4in.	3½in.
Condition of land at time of ploughing	Good	Good	Good	Good
Other cultivations	Springtyned in Aug. Harrowed immediately after and cultivated after rain in Mar. before seeding	Springtyned in Sept. Wimmera scarifier before seeding. Combine drill with light drag harrows	Half disced immediately after ploughing and all disced again before seeding	Disced in Aug. again Sept., again Oct. Springtyned after rain in March and again in April
Variety ...	Nabawa	Newman's Early	Newman's Early	Bald Early
Planted ...	1st week in May	1st and 2nd week in May	Middle of May	1st week May
Rate of Seed	50lbs.	45lbs.	60lbs.	45lbs.
Graded ...	Yes	Yes	Yes	Yes
Treated ...	Yes (dry)	Yes (dry)	Yes (dry)	No
Rate of Super.	85lbs.	90lbs.	60lbs.	80lbs.
Disease ...	Trace Take-all and Rust.	Slight trace Rust and of Take-all	Take-all, Flag Smut and Rust	Scattered Take-all, Flag Smut and Rust

Competitor.	Clarke, F. J.	Clothier, J.	Maughan Bros.
Years cropped	5	Old land	3
Timber ...	Salmon and Gimlet	Heavy Mallee and Ti-tree	Salmon and Gimlet
Ploughed ...	July	July and August	August
Type of Plough	Mouldboard	Mouldboard and Sundercut	State Cultivating Plough
Depth ...	3½in.—4in.	2½in.—4in.	3in.—4in.
Condition of land at time of ploughing	Good	Good	Inclined to bog
Other cultivations	Disc. cultivated after ploughing, again in March. Springtyned in front of the Drill	Springtyned in Sept. and March after rain. Drilled with Combine and harrowed	Cultivated in March. Drilled with Combine
Variety ...	Nabawa	Newman's Early	Nabawa
Planted ...	Middle of April	2nd week May	1st week May
Rate of Seed	45lbs.	45lbs.	45lbs.
Graded ...	No	Yes	Yes
Treated ...	Yes (dry)	Yes (dry)	No
Rate of Super.	66lbs.	90lbs.	90lbs.
Disease ...	Patches of Take-all	Traces of Flag Smut, Take-all and Rust	Bunt and trace of Rust

Bruce Rock Agricultural Society.

When entries closed for this competition, no less than 30 had been received, but owing to the subsequent withdrawal of 20, there remained 10 for inspection. The awards are given in the following table:—

TABLE 13.

BRUCE ROCK AGRICULTURAL SOCIETY.

ZONE 5.

Judge: I. THOMAS—Superintendent of Wheat Farms.

Competitor.	District.	Variety.	Yield, 40 points.	Freedom from Weeds, 20 points.	Freedom from Disease, 15 points.	Freedom from Admixture, 15 points.	Evenness of Growth, 10 points.	Total, 100 points.
Smith, C., & Sons	Yarding ...	Gluclub ...	33	17	13	13	7	83
Johnson, W. D.	Bruce Rock ...	Nabawa ...	31	17	12	14	8	82
Bristow, J. W....	Ardath ...	Merredin ...	28	17	13	13	9	80
McCarthy, P., & Sons	Eujinyn ...	Gluyas Late	27	17	13	14	8	79
Harling Bros. ...	Belka	Nabawa ...	28	17	13	12	8	78
Allen, R. M., K., and C.	Sth. Kumminin	Onas ...	27	17	13	13	7	77
Schilling, C. E and W. S.	Bungullapin ...	Gluyas Early	25	17	13	12	7	74
Brown, S. A. ...	Bungullapin ...	Onas ...	23	17	12	13	8	73
Wyatt, W. ...	Eujinyn ...	Gluyas Early	24	16	12	13	7	72
Starcevich, J. ...	Belka	Nabawa ...	27	15	11	11	7	71

Messrs. C. Smith & Sons were awarded first prize with a crop of Gluclub. It was somewhat irregular in height and stooling, was fairly free from weeds and disease, a trace of stem rust and take-all being present. There was also a slight admixture.

This variety is one which was bred by Mr. C. Smith, senior. The competitors plant the major portion of their area under crop with it and have had considerable success.

It has a very attractive appearance, and although it grows fairly tall under favourable conditions, appears to be fairly strong in the straw. It has one serious defect in that it sheds its grain readily and therefore it is inadvisable to plant it in large areas unless a sufficient harvesting plant is available to deal with it without delay once maturity has been reached.

Mr. C. Smith is to be congratulated on his successful efforts to produce a high yielding variety and one that suits his conditions so well.

Mr. W. D. Johnson's competing crop of Nabawa was part of a field of 78 acres of that same variety. It was of a more even growth than the winning crop and contained less admixture but was not so free from disease, having take-all along one side and ball smut scattered throughout, the latter the result of non-treatment of seed.

As was the case in the Merredin Society's competition, the third crop was of the variety Merredin. It was also very attractive, of a convenient stripping height and of very even stooling, except on one side of the plot.

The rainfall officially recorded at Bruce Rock was:—

——	Jan.	Feb.	Mch.	Apl.	Growing Period.							Nov.	D	Total for year.
					May.	June.	July.	Aug.	Sept.	Oct.	Total.			
Bruce Rock	...	...	532	25	98	176	158	133	172	71	808	23	29	1,417

The methods of cultivation adopted by the competitors are as hereunder:—

TABLE 14.

BRUCE ROCK DISTRICT CROP COMPETITION.

ZONE 5.

Competitor.	C. Smith & Son.	Johnson, W. D.	Bristow, J. W.	McCarthy & Sons.	Harling Bros.
Years cropped	2nd	3	6	10	5
Timber ...	Salmon Gum and Gimlet	Salmon Gum and Gimlet	Salmon Gum and Gimlet	Gimlet	Gimlet, Salmon, and White Gum
Ploughed ...	June and July	August	July and Aug.	June	March
Make of Plough	Mouldboard	Mouldboard	Disc Shearer	Disc	Disc
Depth ...	3in.	3½in.	2½in.	4in.	3in. and 4in.
Condition of land at time of ploughing	Good	Getting dry	Boggy	Good	Dry
Other cultivations	Sundercut end Aug., again in Sept. and again in Oct. with Springtyne Sundercut after March rain	With Sundercut in Sept., in March. and cultivator in front of drill.	Sept. Cultivated with Springtyne in Mar. twice following Combine drill	Sundercut Aug. Springtyne Oct., March after rain and Combine drill harrows attached	Sundercut July, again in Sept. Springtyne cultivated before seeding
Variety ...	Gluclub	Nabawa	Merredin	Gluyas Late	Nabawa
Planted ...	End of April	Last week Apl.	Last week May	3rd Week Apl.	1st week May
Rate of seed ...	45lbs.	45lbs.	60lbs.	45lbs.	45lbs.
Graded ...	Yes	Yes	Yes	Yes	Yes
Treated ...	Dry	No	Dry	Yes	No
Rate of Super.	100lbs.	90lbs.	97lbs.	90lbs.	90lbs.
Disease ...	Slight traces of Takeall and Rust	Ball Smut scattered. Takeall down one side of crop	Flag Smut and a trace of Takeall	Takeall scattered and in small patches	Trace of Takeall

TABLE 14—*continued.*

BRUCE ROCK DISTRICT CROP COMPETITION—*continued.*

ZONE 5.

Competitor.	Allen Bros.	Schilling, C. E. and W. S.	Brown, S. A.	Wyatt.	Starcevich, J.
Years cropped	9 at least	Old	5	4	New land
Timber ...	Salmon Gum and Gimlet, Jam patches	Jam, York Gum, and Gimlet	Salmon Gum and Gimlet, and little Morrell	Mallee and Ti-tree	Salmon Gum and Gimlet
Ploughed ...	July	July	July	July	August
Make of plough	Mouldboard	Mouldboard	Mouldboard	Mouldboard	Mouldboard.
Depth ...	3½in.	3in.	3in.	5in.	4in.
Condition of land at time of ploughing	Good	Good	Good	Good. Patches boggy	Getting dry.
Other cultivations	With Springtyne in Sept. again in Oct. again before seeding after the Mar. rain. Harrow attached to drill	Harrowed after fallowing in Aug. Sundercut in Sept. Combine drill harrows attached	Springtyne Sept. to Oct. and in April after March rains. Harrow attached to drill	Sundercut Aug. and late March. Harrows attached to drill	Disced in Sept. again before planting
Variety ...	Onas	Gluyas Early	Onas	Gluyas Early	Nabawa
Planted ...	3rd week in April	4th week in May	2nd week in May	2nd week June	Last week Apl.
Rate of Seed ...	60lbs.	60lbs.	45lbs.	54lbs.	60lbs.
Graded ...	Yes	Yes	Yes	Yes	No
Treated ...	Dry	Dry	No	No	Dry
Rate of Super.	90lbs.	90lbs.	90lbs.	90lbs.	70lbs.
Disease ...	Trace of Ball Smut, Flag Smut and Takeall	Trace of Flag Smut and Takeall	Little Flag Smut, Ball Smut scattered and trace of Takeall	Trace Ball Smut, Flag Smut, and Takeall	Smut and patches of Takeall

Doodlakine-Baandee District Agricultural Society.

The number of entrants for this competition was not large, nor was the general standard of the crops so high as that of the previous year.

The awards made are as hereunder:—

TABLE 15.

DOODLAKINE-BAANDEE AGRICULTURAL SOCIETY.

ZONE 5.

Judge: I. THOMAS—Superintendent of Wheat Farms.

Competitor.	District.	Variety.	Yield, 40 points.	Freedom from Weeds, 20 points.	Freedom from Disease, 15 points.	Freedom from Admixture, 15 points.	Evenness of Growth, 10 points.	Total, 100 points
Prowse, Bros. ...	Doodlakine ...	Nabawa ...	32	17	13	13	8	83
Kay, J.... ...	Baandee ...	Gluyas Early	24	16	13	13	7	73
Barton, R., & Son	North Baandee	Gluyas Late	20	18	14	13	7	72
Barnes, F. ...	Woolundra ...	Merredin ...	24	16	12	12	8	72
Spilliman, D. J.	North Baandee	Gluyas Early	24	16	12	13	7	72

The winning crop, however, was of a high standard and in marked contrast to that of the remainder. It formed part of 500 acres of the same variety, and although a thorough inspection was not made of the whole, little or no difference was apparent. It was, indeed, a pleasant sight, growing as it was on undulating country surrounded by other fields of growing crop which appeared similar to the one inspected.

The rainfall, as officially recorded at Baandee and Doodlakine, was:—

——	Jan.	Feb.	Mch.	Apl.	Growing Period.							Nov.	Dec.	Total for year.
					May.	June.	July.	Aug.	Sept.	Oct.	Total			
Baandee	...	...	516	28	75	178	134	90	138	49	664	32	44	1,284
Doodlakine	...	2	448	24	64	176	141	101	130	61	673	29	70	1,246

The methods of cultivation employed by the competitors are as hereunder:—

TABLE 16.

DOODLAKINE–BAANDEE DISTRICT CROP COMPETITION—(50 ACRES).

ZONE 5.

Competitor	Prowse Bros.	Kay, J.	Barton & Sons.	Barnes, F.	Spillman, D. J.
Years cropped	7 to 8 crops	Old land	New land	2nd crop	Old
Timber ...	Salmon Gum, Ti-tree, Gimlet, and Morrell	York Gum and Ti-tree, little Salmon Gum	Salmon Gum and Gimlet, White Gum, York, Ti-tree, and Mallee	Mallee, Gimlet, and Salmon Gum	Morrell, Salmon Gum and Gimlet
Ploughed ...	July	End of July	1st week Aug.	July	July and Aug
Type of Plough	Mouldboard	Mouldboard	Disc	Disc	Mouldboard
Depth ...	3½in.	3in. and 4in.	3in.	3½in. and 4in.	3in. and 4in.
Condition of land at time of ploughing	Good	Getting dry	Good	Good	Fairly good (somewhat wet)
Other cultivations	Disc cultivation in Sept. again before seeding and Springtyned after Disc.	Cultivated with Springtyne after rain in Mar.; and with Sundercut prior to seeding	Cultivated with Duckfoot. Scarifier following harrows immediately prior to planting	Cultivated with Springtyne in Aug. Harrows attached to Drill	Cultivated with Sundercut in Sept. Springtyned in March (some twice)
Variety ...	Nabawa	Gluyas Early	Gluyas Late	Merredin	Gluyas Early
Planted ...	1st and 2nd week May	Last week May	2nd week May	3rd week May	Last week May
Rate of Seed...	45lbs.	50lbs.	60lbs.	60lbs	45lbs.
Graded ...	Recleaned	Yes	Yes	Yes	Yes
Treated ...	No	Dry	Dry	Yes	Dry
Rate of Super.	90lbs.	100lbs.	90lbs.	80lbs.	60lbs.
Disease ...	Trace of Rust, Footrot and Smut	Flag Smut and trace of Take-all	A few dummy heads apparently due to climatic and soil conditions	Trace of Ball Smut, Flag Smut, and more than a trace of Footrot	Rust, Foot Rot, and Flag Smut were noted

Royal Agricultural Society.

Two competitors who entered direct with the Royal Agricultural Society submitted their crops for inspection. They were Mr. R. B. Nottage of Tammin and Mr. J. D. Hammond of Kellerberrin.

The awards made are set out in the table hereunder:—

TABLE 17.—THE ROYAL AGRICULTURAL SOCIETY.—ZONE 5.
Judge: I. THOMAS—Superintendent of Wheat Farms.

Competitor.	District.	Variety.	Yield, 40 points.	Freedom from Weeds, 20 points.	Freedom from Disease, 15 points.	Freedom from Admixture, 15 points.	Evenness of Growth, 10 points.	Total, 100 points.
Nottage, R. B....	Tammin ...	Nabawa ...	26	17	13	13	8	77
Hammond, J. D.	Kellerberrin ...	Nabawa ...	25	17	13	14	7	76

The rainfall, as officially recorded at Tammin and Kellerberrin, was:—

——	Jan.	Feb.	Mch.	Apl.	Growing Period.							Nov.	Dec.	Total for year.
					May.	June.	July.	Aug.	Sept.	Oct.	Total.			
Tammin	6	14	495	20	106	202	238	166	94	120	926	40	4	1,505
Kellerberrin	...	8	599	29	107	219	170	145	136	102	939	48	4	1,567

The methods of cultivation practised by the competitors are as hereunder:—

ROYAL CROP COMPETITION.
ZONE 5.

Competitor	R. B. Nottage.
Years cropped fallowed ...	2nd.
Timber	Salmon Gum, Gimlet and Morrell.
Ploughed	July and August.
Type of Plough	Tandem Disc.
Depth	2½in.
Condition of land at time of ploughing	Good.
Other cultivations	With sundercut in April followed by combine drill.
Variety	Nabawa
Planted	2nd week in June.
Rate of seed	55lbs.
Graded	Yes.
Treated	No.
Rate of super.	70lbs.
Disease	Takeall and very slight trace of smut.

ZONES 4, 6, 7, AND 8.

Judge: A. S. WILD, B.Sc. (Agric.), Agricultural Adviser.

ZONE 4.

With one exception, all the entries received for this zone were from the Nungarin District Agricultural Society, Mrs. E. H. Richards of Southern Cross entering direct with the Royal Agricultural Society.

Nungarin Agricultural Society.

Of the twelve entries received, eleven crops were submitted for inspection. Five of these were crops of the variety Nabawa, five of Gluyas Early and one of Caliph. In all the crops inspected, traces of spring rust were noticed.

The points awarded are as hereunder:—

TABLE 18.

NUNGARIN AGRICULTURAL SOCIETY.

ZONE 4.

Judge: A. S. WILD—Agricultural Adviser.

Competitor.	District.	Variety.	Yield. 40 points.	Freedom from weeds. 20 points.	Freedom from Disease. 15 points.	Freedom from Admixture. 15 points.	Evenness of Growth. 10 points.	Total. 100 points.
1—Reynolds, A. G.	Mukinbudin ...	Gluyas Early	35	18	13	13	9	88
2—Young, G. T.	Talgomine ...	Gluyas Early	33	17	14	14	8	86
3—Jolly, H. P.	Mangowine ...	Nabawa ...	29	18	14	12	9	82
4—Williams, F. A.	Mangowine ...	Nabawa ...	31	18	14	12	7	82
5—Creagh, Bros	Kwelkan ...	Gluyas Early	29	18	13	12	9	81
6—Johnston, J.	Mangowine ...	Nabawa ...	25	19	14	14	9	81
7—Dumsday, L.	Talgomine ...	Nabawa ...	29	17	13	13	7	79
8—Watson Bros	Nungarin ...	Gluyas Early	29	18	13	10	9	79
9—Fitzpatrick, R.	Nungarin ...	Nabawa ...	27	18	13	13	7	78
10—Mulqueeny, J.	Lake Brown ...	Gluyas Early	26	17	13	12	8	76
11—Herbert, G. H.	Nungarin ...	Caliph ...	28	17	11	12	8	76

The winning crop, that of Mr. A. G. Reynolds of Mukinbudin, was planted with the variety Gluyas Early at the beginning of May at the rate of 38lbs. of seed per acre, 100lbs. of superphosphate per acre being applied. This crop was of very even growth and except for small patches of thistles and silver grass was free from weeds. It contained a few strange heads of other varieties and scattered wild oats.

The heads were well filled and the general appearance of the crop gave one the impression of its being a heavy yielder, this being confirmed by the subsequent calculated yield, which was 35 bushels per acre.

Mr. G. T. Young's crop, which secured second place, was also of the variety Gluyas Early—a good even crop except in a few small, hard patches. It was free from admixture but contained various weeds, fortunately not numerous, including wild oats. This crop was planted about the middle of May at the rate of 45lbs. of graded treated seed and 85lbs. of superphosphate per acre.

All the crops entered by this Society were of a high standard, and the interest and friendly rivalry displayed by the competitors is worthy of favourable comment.

The rainfall, as officially recorded at Nungarin, Mangowine and Mukinbudin during 1927, was:—

——	Jan.	Feb.	Mch.	Apl.	Growing Period.							Nov.	Dec.	Total for year.
					May.	June.	July.	Aug.	Sept.	Oct.	Total.			
Nungarin	8	4	455	60	67	210	209	67	122	88	763	26	33	1,349
Mangowine	22	5	530	62	55	309	236	100	135	28	863	50	15	1,547
Mukinbudin	...	...	620	64	51	219	226	70	173	22	761	18	13	1,476

The details of the methods of cultivation and cropping employed by the various competitors are as hereunder:—

TABLE 19.

NUNGARIN DISTRICT CROP COMPETITION.

ZONE 4.

Competitor.	Reynolds, A. G.	Young, G. T.	Jolly, H. P.	Williams, F. A.
Years cropped	10.	3rd crop	14 years.	4th crop
,, fallowed	5 and 6 crops		About 10 crops	
Timber ...	Salmon and Gimlet	Salmon and Gimlet	Morrell, Salmon and Gimlet	Salmon, Gimlet and Mallee
Ploughed ...	Middle of June	July	Beginning of June	July
Type of Plough	Federal Disc	Martin Mouldboard	Sundercut	Sundercut
Depth	3½in. to 4in.	4in. to 4½in.	4in.	3in. to 4in.
Condition of land at time of ploughing	Excellent	Good	Excellent	Part good, and some dry
Other cultivations	Disced 2½in. 1st wk. in August. Cultivated end Sept. Harrowed in Oct. Cultivated March. Harrowed March. Drilled with Combine	Skimmed with Sundercut end of March and end of April. Springtyned end April. Harrowed behind drill	Harrowed after fallowing, cultivated Sept. without drag harrows. Cultivated March with drag harrows. Drilled Combine	Skim ploughed September and harrowed. Springtyned last week April
Variety ...	Gluyas Early	Gluyas Early	Nabawa	Nabawa
Planted ...	1st week May	18th May	Middle of May	Middle of May
Rate of Seed...	38lbs.	45lbs.	45lbs.	45lbs.
Graded ...	Recleaned	Yes	Recleaned	Yes
Treated ...	Yes (dry)	Yes (dry)	Yes (dry)	Yes (dry)
Rate of Super.	98lbs. to 100lbs	85lbs.	75lbs.	60lbs.
Disease ...	Trace of Rust	Trace of Rust	Trace of Rust	Trace of Rust

NUNGARIN DISTRICT CROP COMPETITION—*continued*.

ZONE 4.

Competitor.	Creagh, Bros.	Johnson, J.	Dumsday, L.	Watson Bros.
Years cropped	5 or 6 crops	3rd crop	1st crop	Wheat continuously for 10 years. Fallow, wheat rotation for 5 years
,, fallowed				
Timber ...	Salmon, Gimlet and Morrell	Salmon, Gimlet and York	Salmon and Gimlet	Salmon and Gimlet
Ploughed ...	July	Middle of June to middle July	July	Early July
Type of Plough	Sundercut	Sunrise Disc	Disc	Sundercut
Depth	3½in. to 4in.	4in.	3in.	3½in. to 4in.
Condition of land at time of ploughing	Good	Good	Good	Good
Other Cultivations	Skim ploughed end Sept. Cultivated end Mar. Drilled with Combine	Springtyned Aug. and harrowed. Cultivated end of March and harrowed. Drilled with Combine	Springtyned Sept. and Mar. Planted with Combine	Skim ploughed end of Sept. Cultivated with Disc. harrows in March
Variety ...	Gluyas Early	Nabawa	Nabawa	Gluyas Early
Planted ...	Middle of May	May 5th to 16th	1st week in May	End of April
Rate of Seed ...	45lbs.	45lbs.	45lbs.	48lbs.
Graded ...	Recleaned	Yes	Yes	No
Treated ...	Yes (dry)	Yes (dry)	Yes (dry)	Yes (dry)
Rate of Super.	80lbs.	70lbs.	100lbs.	80lbs.
Disease ...	Trace of Rust and Flag Smut	Trace of Rust	Trace of Rust and Flying Smut	Trace of Rust and Flag Smut

Competitor.	Fitzpatrick, R.	Mulqueeny, J.	Herbert, G. H.
Years cropped	1st crop	3rd crop	10 years
,, fallowed			
Timber ...	Scrub	Mallee and Gimlet	Salmon, Gimlet and Morrell
Ploughed ...	Middle of August	Early July	June
Type of Plough	State Disc	State Disc	Duckfoot scarifier
Depth	5in.	4in.	2in.
Condition of land at time of ploughing	Good	Good	Good
Other Cultivations	Rolled before and after seeding	Skim ploughed early Sept. Springtyned in March and again before seeding	Reploughed with scampier. Skim ploughed again end August. Springtyned early Oct. Harrowed twice in Mar. Skimmed prior to seeding. Drilled with Combine
Variety ...	Nabawa	Gluyas Early	Caliph
Planted ...	End of April	Middle of May	End of April
Rate of Seed ...	60lbs.	45lbs.	32lbs.
Graded ...	No	Recleaned	Recleaned
Treated ...	No	Yes (dry)	Yes
Rate of Super.	90lbs.	70lbs.	90lbs.
Disease ...	Trace of Rust and Flying Smut	Trace of Rust and Flag Smut	Trace of Rust, Flying Smut, Flag Smut, and Ball Smut

Royal Agricultural Society.

The competing crop of Mrs. E. H. Richards of Southern Cross, which was entered direct with the Royal Agricultural Society, is of particular interest, owing to it being situated on the fringe of the Eastern Wheat Belt. The soil was a red friable loam from which had been cleared Salmon Gum and Gimlet timber prior to being prepared for this its 10th crop.

The points awarded are:—

ROYAL AGRICULTURAL SOCIETY.

Name.	District.	Variety.	Estimated Yield.	Freedom from Weeds.	Freedom from Disease.	Freedom from Admixture.	Evenness & of Growth.	Total.
			40 pts.	20 pts.	15 pts.	15 pts.	10 pts.	100 pts.
Richards, E. H.	Southern Cross	Gluyas Early	29	18	13	12	9	81

The variety Gluyas Early was planted about the middle of May at the rate of 33 to 40 lbs. of graded seed with an application of superphosphate at the rate of 75 to 80 lbs. per acre. It was a fine even crop and was calculated to yield 29 bushels per acre. Except at one end it was comparatively free from weeds, but traces of flag and ball smut were noticed. The crop also contained a few strange plants of other varieties and a little barley.

The rainfall, as officially recorded at Southern Cross, was:—

——	Jan.	Feb.	Mch.	Apl.	Growing Period.							Nov.	Dec.	Total for year.
					May.	June.	July.	Aug.	Sept.	Oct.	Total.			
Southern Cross	13	30	665	53	138	67	165	48	322	39	779	30	19	1,589

The details of cropping and cultivation are as hereunder:—

TABLE 20.
ROYAL CROP COMPETITION.
ZONE 4.

Competitor.	Richards, E. H.
Years cropped	1st crop
Timber	Salmon and Gimlet
Ploughed	End of June
Type of Plough	Sundercut
Depth	3in. and 4in.
Condition of land at time of ploughing	Good
Other Cultivations	Springtyned in August, November, April and March
Variety	Gluyas Early
Planted	Middle May
Rate of Seed	30lbs to 40lbs.
Graded	Recleaned
Treated	Yes (dry)
Rate of Super.	75lbs. to 80lbs.
Disease	Trace of Flag Smut and Ball Smut

ZONE 6.

Three entries were received by the Royal Agricultural Society, no district society conducting crop competitions in this zone.

The points awarded are as hereunder.—

TABLE 21.—ROYAL AGRICULTURAL SOCIETY.—ZONE 6.
Judge: A. S. WILD—Agricultural Adviser.

Competitor.	District.	Variety.	Yield. 40 points.	Freedom from weeds. 20 points.	Freedom from Disease. 15 points.	Freedom from Admixture. 15 points.	Evenness of Growth. 10 points.	Total. 100 points.
Richards, T. ...	South Caroling	Nabawa ...	34	18	14	14	8	88
McLean, J. ...	County Peak ...	Nabawa ...	29	18	14	14	8	83
Smith, H. D. ...	Beverley ...	Yandilla King	24	18	12	13	9	76

The winning crop of Nabawa variety was submitted by Mr. T. Richards, senior, of South Caroling. This was planted during the third week in May at the rate of 50lbs. of seed per acre. A dressing of superphosphate, 120lbs. per acre, was applied. The plants were well stooled, well headed and fairly even in height, and the crop showed marked freedom from weeds, disease and admixture. It was calculated to yield 34 bushels to the acre. The land, which was Salmon Gum and Gimlet country, had been carefully prepared for this crop.

Mr. Richards, who won the cup for his zone in the Wheat Yields Competition 1924-26, is to be congratulated on his further success.

The crop of Mr. John McLean, of County Peak, which secured second place, was also very creditable. This was planted with the variety Nabawa during the last week in May at the rate of 65lbs. of graded seed per acre, 112lbs. of superphosphate per acre being applied. The original timber on the undulating land was Morrell and Salmon Gum, with one corner of Jam. The plants were well headed and well stooled. Small patches of take-all were noticed, and scattered through the crop were a number of empty heads. Weed growth was limited to a few mustard plants and some cockspurs. The calculated yield of this crop was 29 bushels per acre.

The crop of Mr. H. D. Smith, of Beverley, was of the variety Yandilla King. It was planted during the second week in May with 43lbs. of ungraded seed per acre. Superphosphate was applied at the rate of 70lbs. per acre. This was a very even crop and at first sight appeared to be a much heavier yielder than it actually was. However, it was badly affected by rust. Small patches of take-all were noticed. A few heads of wheat varieties other than Yandilla King, together with wild oats and drake, were scattered through the crop.

It is to be regretted that more entries were not received in Zone 6. Much more benefit would be derived from the competition if greater interest were taken in this direction.

The rainfall, as officially recorded at Beverley, South Caroling and Bally Bally (County Peak), was:—

——	Jan.	Feb.	Mch.	Apl.	Growing Period.							Nov.	Dec.	Total for year.
					May.	June.	July.	Aug.	Sept.	Oct.	Total.			
Beverley	9	21	337	50	103	303	319	167	189	126	1,207	31	7	1,662
South Caroling	...	...	338	43	110	210	203	117	131	105	876	49	...	1,306
Bally Bally	...	...	361	28	97	248	263	181	144	188	1,121	40	6	1,556

The cultural details of cropping are as hereunder:—

TABLE 22.
ROYAL CROP COMPETITION.
ZONE 6.

Competitor.	Richards, T.	McLean, John.	Smith, H. D.
Years cropped	18 years	20 years	4th crop
,, fallowed	...	...	2 fallows
Timber	Gimlet and Salmon	Morrell, Salmon and Jam	Jam and Manna Gum
Ploughed	July	July	September
Type of Plough	State Mouldboard	Massey Mouldboard	Mouldboard
Depth	4½in. and 5in.	4in.	4in.
Condition of land at time of ploughing	Good	Good	Good
Other Cultivations ..	Springtyned in Sept., and 3 or 4 times after the winter rains and again after March rains	Springtyned twice in Sept., part undercutted in March and all skimmed with undercut before drilling. Springtyned and harrowed just after drilling	Springtyned in April. Drilled with Combine.
Variety	Nabawa	Nabawa	Yandilla King
Planted	20th May	Last week in May	2nd week in May
Rate of Seed	50lbs.	65lbs.	43lbs.
Graded	Yes	Yes	No
Treated	Yes (dry)	Yes (dry)	No
Rate of Super.	120lbs.	112lbs.	70lbs.
Disease	Trace of Rust	Whiteheads and small patches of Take-all	Rust, Take-all and Septoria

ZONE 7.

The crops entered in the Kulin District Agricultural Society's crop competition were the only competitors in this zone.

The awards made in this competition are as hereunder:—

TABLE 23.
KULIN AGRICULTURAL SOCIETY.
ZONE 7.
Judge: A. S. WILD—Agricultural Adviser.

Competitor.	District.	Variety.	Estimated Yield, 40 points.	Freedom from weeds, 20 points.	Freedom from Disease. 15 points.	Freedom from Admixture, 15 points.	Evenness of Growth, 10 points.	Total, 100 points.
Nichols, R. ...	Kulin	Nabawa ...	30	19	13	13	8	83
Roberts Bros. ...	Kulin	Hard Federation	28	18	14	12	8	80
Biglin, E. J. ...	Karlgarin ...	Nabawa ...	28	18	13	12	8	79
Parker & Baldock	Kulin	Nabawa ...	24	19	14	13	8	78
Trotter, A. W....	Kulin	Hard Federation	25	18	13	13	7	76
Dowey, P. J. ...	Kulin	Gluyas Late	22	17	14	14	7	74
Weaver, A. J. ...	Kulin	Nabawa ...	23	19	14	11	7	74
Hooper, W. ...	Kulin	Nabawa ...	25	16	12	12	7	72

Further entries were received, but only eight crops were submitted for inspection. It was unfortunate that some competition crops had been and others were being stripped at the time of inspection, thus necessitating so many withdrawals.

Mr. R. Nichols secured first place with his crop of the variety Nabawa, planted during the second week in May at the rate of 55lbs. of seed and 80lbs. of superphosphate per acre. This was a heavy crop containing only a few strangers and barley heads. The weeds were confined to a few cockspurs and thistles. Small quantities of take-all, flying smut and spring rust were noticed.

The rainfall, as officially recorded at Kulin, was:—

——	Jan.	Feb.	Mch.	Apl.	Growing Period.							Nov.	Dec.	Total for year.
					May.	June.	July.	Aug.	Sept.	Oct.	Total.			
Kulin ...	...	7	220	32	182	264	220	122	137	166	1,091	20	11	1,381

The cultural details of the cropping are as hereunder:—

TABLE 24.

KULIN DISTRICT CROP COMPETITION.

ZONE 7.

Competitor.	Nicholas, R.	Roberts Bros.	Biglin, E. J.	Parker & Baldock.
Years cropped ...	4th crop	Unknown	4th crop	2nd crop
,, fallowed ...	...	...	1 fallow	1 fallow
Timber	York Gum, Jam, Mallee, odd Salmon	York, Jam, Morrel, Mallee	Salmon and Gimlet	Morrell, Salmon, Blackbutt and Ti-tree
Ploughed	End of July	July	July	June
Type of Plough ...	Shearer Disc	Shearer Disc	Disc	Mouldboard skim
Depth	3in.	3in. and 3½in.	3½in. and 4in.	2in.
Condition of land at time of ploughing	Good	Wet	Hard in patches	Good
Other cultivations	Skim ploughed August, Springtyned Sept. and Nov. after rain. Springtyned Feb.	Skim ploughed August, Springtyned March. Drilled with Combine	Cross ploughed 4in. in August. Springtyned early October. Springtyned after Mar. rains and before drilling	Springtyned Aug. Drilled with Combine
Variety	Nabawa	Hard Federation	Nabawa	Nabawa
Planted	From 8th May	30th May	1st week May	10th May
Rate of Seed ...	55lbs.	60lbs.	50lbs.	50lbs.
Graded	Yes	Yes	Recleaned	Yes
Treated	Yes (dry)	Yes (dry)	Yes (dry)	Yes (dry)
Rate of Super. ...	80lbs.	120lbs.	80lbs.	64lbs.
Disease	Trace of Rust, Take-all and Flying Smut	Trace of Flag Smut and Whiteheads	Trace Ball Smut	Trace Leaf Spot and Whiteheads

KULIN DISTRICT CROP COMPETITION—*continued.*

ZONE 7.

Competitor.	Trotter, A. W.	Bowey, P. J.	Weaver, A. J.	Hooper, W.
Years cropped ...	3rd crop	Unknown	1st crop	4 crops
,, fallowed ...	2 fallows	... ...	...	1 fallow
Timber	Jam and York Gum	Salmon with sprinkling of Morrell	York, Jam and Salmon	Salmon and Morrel: Mallee one end
Ploughed	August	End of June	End of July	June
Type of Plough ...	Shearer Disc	Disc	Springtyne Cultivator	Sundercut
Depth	4in.	3in.	2in.	5in.
Condition of land at time of ploughing	Satisfactory	Good	Good	Good
Other cultivations	Skim ploughed end Sept. Springtyned end Nov. and before seeding	Springtyned Aug. and drilled with Combine	Springtyned to 3in. at end of August. Duckfoot cultivated before drilling	Skim ploughed Aug. and Mar. Drilled with Combine
Variety	Hard Federation	Gluyas Late	Hard Federation	Nabawa
Planted	Middle of May	2nd week May	3rd Week in April	Middle April
Rate of Seed ...	60lbs.	48lbs.	50lbs.	60lbs.
Graded	Yes	Yes	Yes	Yes
Treated	Yes (dry)	Yes (dry)	Yes (dry)	Yes (wet)
Rate of Super. ...	90lbs.	85lbs.	60lbs.	100lbs.
Disease	Trace of Rust and Flying Smut	...	Trace of Rust and Take-all	Ball Smut and Whiteheads

ZONE 8.

With one exception all the competitors who submitted their crops for inspection in this zone were entered in the Gnowangerup Agricultural Society's crop competition. Of the three entries received by the Royal Agricultural Society, two withdrew.

Gnowangerup District Agricultural Society.

In the competition of the above Society, thirteen entries were received, but owing to withdrawals only eight crops were inspected.

The awards made are as hereunder:—

TABLE 25.

GNOWANGERUP AGRICULTURAL SOCIETY.

ZONE 8.

Judge: A. S. WILD—Agricultural Adviser.

Competitor.	District.	Variety.	Yield. 40 points.	Freedom from weeds. 20 points.	Freedom from Disease. 15 points.	Freedom from Admixture. 15 points.	Evenness of Growth. 10 points.	Total. 100 points.
Parkinson, A. W.	Gnowangerup...	Yandilla King	40	19	13	13	9	94
Murray, C. ...	Borden ...	Nabawa ...	35	18	14	14	8	89
Davis, N. L. P....	Gnowangerup...	Yandilla King	34	18	13	14	8	87
White, A. J. ...	Pallinup ...	Walkers ...	33	19	14	13	8	87
McDonald, J. ...	Gnowangerup...	Nabawa ...	33	18	13	14	8	86
Barnard, C. E....	Pallinup ...	Turvey ...	29	17	12	12	8	78
Richards, C. J....	Gnowangerup...	Yandilla King	28	15	12	13	7	75
Wyatt, C. A. ...	Pallinup ...	Nabawa ...	27	16	11	14	7	75

The winning crop was of the variety Yandilla King. It was even in height, well stooled and headed and very dense. Although infected slightly by stem rust, the grain was normal. The weeds had been kept under control by thorough cultural operations assisted by pasturing of sheep on the land before and during the fallow period. This crop reflected great credit on its owner, Mr. A. W. Parkinson, who is to be congratulated on winning not only the district competition and the zone championship, but also the Royal Agricultural Society's special prize for the highest yield in any zone.

A. W. Parkinson's 50 acres "Yandilla King."

The crop had been planted during the second week in May with 45lbs. of graded seed to the acre and an application of 112lbs. of superphosphate per acre.

The crops entered by the Gnowangerup Society were all of a high standard. That of Mr. C. A. Wyatt, which showed exceptional promise earlier in the year, was unfortunately affected by take-all and root-rot.

The rainfall as officially recorded at Gnowangerup was:—

——	Jan.	Feb.	Mch.	Apl.	Growing Period.							Nov.	Dec.	Total for year.
					May.	June.	July.	Aug.	Sept.	Oct.	Total.			
Gnowangerup	70	6	177	72	74	259	169	115	378	253	1,248	28	24	1,625

The methods of cultivation and other details are as hereunder:—

TABLE 26.—GNOWANGERUP DISTRICT CROP COMPETITION.—ZONE 8.

Competitor.	Parkinson, A. W.	Murray, G.	Davis, N. L. P.	White, A. J.
Years cropped ...	10 years	1st crop	About 7 crops	3rd or 4th crop
Timber	York, Morrell, Jam	Poot, Jam, Mallee	York and Morrell	Morrell, York, Manna Gum
Ploughed	July	Early August	Middle July to end of August	July and August
Type of Plough ...	Smith Mouldboard	Shearer Mouldboard	State Mouldboard	Shearer Mouldboard

GNOWANGERUP DISTRICT CROP COMPETITION—*continued*.

ZONE 8.

Competitor.	Parkinson, A. W.	Murray, G.	Davis, N. L. P.	White, A. J.
Years Cropped ...	10 years	1st crop	About 7 crops	3rd or 4th crop
Depth	3½in. and 4in.	2in.	3½in. and 4in.	3½in. and 4in.
Condition of land at time of ploughing	Good	Good and bad	Good	Good
Other cultivations	Harrowed after ploughing. Springtyned Disc ploughed to 2½in., then harrowed and left. In Mar. Springtyned and disced where thistles growing. cultivated in front of Drill and harrowed after Drill	Springtyned once in February	Skim ploughed early October. Springtyned end of April. Drilled with Combine with light drag harrows	Springtyned Sept. and again in Spring. Drilled with Combine
Variety	Yandilla King	Nabawa	Yandilla King	Walker, S.
Planted	2nd week May	3rd week May	Middle May	1st fortnight in May
Rate of Seed ...	45lbs.	42lbs.	45lbs.	50lbs.
Graded	Yes	Yes	Yes	No
Treated	Yes (formalin)	Yes (dry)	Yes (dry)	Yes (formalin)
Rate of Super. ...	112lbs.	88lbs.	96lbs.	80lbs.
Disease	Rust, trace Flying Smut and Take-all	Trace of Rust and Take-all	Rust and patches of Take-all	Small patches Takeall and Rootrot

Competitor.	McDonald, J.	Barnard, C. E.	Richards, C. J.	Wyatt, C. A.
Years cropped ...	About 10 crops	3 crops	20 years	5th Crop
Timber	Salmon, Morrell, Wattle, York	White Gum and Morrell	York and Poot	Poot and York Gum
Ploughed	End of July	June	End of July	July and August
Type of Plough ...	State Mouldboard	Mouldboard	Massey Mouldboard	State Mouldboard
Depth	3in.	4in.	4in.	3½in.
Condition of land at time of ploughing	Fairly good	Good	Good	Good
Other cultivations	Light harrowed after ploughing, Disced in Sept. Springtyned and harrowed 1st week in March. Harrowed again before drilling. Drag harrows behind Drill	Skim ploughed in Sept. Springtyned in Sept. Oct. and April. Drilled with Combine with light drag	Springtyned Sept. and before drill. Light harrows after Drill	Harrowed lengthways and crossed directly after fallowing. Skim ploughed Sept. and harrowed lengthways. Ploughed back 3rd week in May, length harrowed and cross harrowed after Drill
Variety	Nabawa	Turvey	Yandilla King	Nabawa
Planted	23rd—26th May ...	15th—18th May	Middle May	End of May and beginning of June
Rate of Seed ...	52lbs.	50lbs.	70 to 80lbs.	50lbs.
Graded	Yes	Yes	Recleaned	Yes
Treated	Yes	Yes (formalin)	Yes (wet)	No
Rate of Super. ...	96lbs.	60lbs.	60lbs.	70lbs.
Disease	Trace Rust, Take-all and Rootrot	Rust in patches, Take-all, Rootrot, Flying Smut	Take-all, Rootrot, Rust, and Flying Smut	Take-all, Rootrot and Rust

Royal Agricultural Society.

Mr. M. Clifford, of Gillimanning, was the only competitor in Zone 8, who entered direct with the Royal Agricultural Society.

The points awarded for this crop are as hereunder:—

Name.	District.	Variety.	Estimated Yield.	Freedom from Weeds.	Freedom from Disease.	Freedom from Admixture.	Evenness of Growth.	Total.
			40 pts.	20 pts.	15 pts.	15 pts.	10 pts.	100 pts.
Clifford, M. ...	Gillimanning	Federation	29	17	13	14	7	80

The rainfall as recorded at Wickepin, the nearest official recording station, was:—

——	Jan.	Feb.	Mch.	Apl.	Growing Period.							Nov.	Dec.	Total for year.
					May.	June.	July.	Aug.	Sept.	Oct.	Total.			
Wickepin	2	...	173	42	111	416	251	139	109	168	1,194	54	25	1,490

The details of the cropping are as hereunder:—

TABLE 27.
ROYAL CROP COMPETITION.
ZONE 8.

Competitor: Clifford, M.	
Years cropped	Old land. 4 years under pasture
Timber	York Gum, White Gum, Jam and Wattle
Ploughed	July, August and September
Type of Plough	Mouldboard
Depth	5in.
Condition of land at time of ploughing	Good
Other Cultivations	Springtyned twice in Spring, again before drilling, and again in front of the Drill
Variety	Federation
Planted	Up to 13th May
Rate of Seed	72lbs.
Graded	Yes
Treated	Yes (dry)
Rate of Super	120lbs.
Disease	Take-all and Rootrot. Trace of Flying Smut and Septoria

CHAMPIONSHIP CROP COMPETITIONS.

ROYAL AGRICULTURAL SOCIETY.

The entrants for these championship prizes are the first and second prize winners of the district competitions, and also the competitors who enter direct with the Royal Agricultural Society.

The competitors in the different zones and the total points allotted are shown in the table hereunder:—

REPRESENTATIVES FROM DISTRICT CROP COMPETITIONS.

Zone.	Competitor	Society.	Variety.	Yield, 40 points.	Freedom from Weeds, 20 points.	Freedom from Disease, 15 points.	Freedom from Admixture, 15 points.	Evenness of Growth, 10 points.	Total. 100 points.
1	Bothe, B. D.	Royal ...	Nabawa ...	39	15	13	14	9	90
	Hebiton, J. K.	Royal ...	Merredin	30	17	13	14	8	82
2	Martin, K. J.	Dalwallinu ...	Ford ...	30	18	14	11	8	81
	Harris, W. M.	Dalwallinu ...	Nabawa ...	26	16	13	14	8	77
3	Threfall, G....	Wyalkatchem	Nabawa ...	34	19	14	14	9	90
	Ferries, H. C.	Wyalkatchem	Nabawa ...	32	19	14	13	8	86
	Parker, A. E.	Wongan Hills	Nabawa ...	30	17	14	14	8	83
	Bear, H. E....	Dowerin ...	Gluyas Early	28	18	14	13	9	82
	Cosh, C. E....	Dowerin ...	Gluyas Early	26	19	14	14	8	81
	Ackland, J. H.	Wongan Hills	Nabawa ...	28	17	13	14	8	80
4	Reynolds, A. G.	Nungarin ...	Gluyas Early	35	18	13	13	9	88
	Young, G. T.	Nungarin ...	Gluyas Early	33	17	14	14	8	86
	Richards, E. H.	Royal ...	Gluyas Early	29	18	13	12	9	81
5	Rowan, C. ...	Merredin ...	Nabawa ...	34	17	13	13	8	85
	Pollock, R....	Merredin ...	Nabawa ...	32	17	13	13	9	84
	Prowse Bros.	Doodlakine and Baandee	Nabawa ...	32	17	13	13	8	83
	Smith, C., & Sons	Bruce Rock	Gluclub ...	33	17	13	13	7	83
	Johnson, W. D.	Bruce Rock	Nabawa ...	31	17	12	14	8	82
	Nottage, R. D.	Royal ...	Nabawa ...	26	17	13	13	8	77
	Hammond, J. D.	Royal ...	Nabawa ...	25	17	13	14	7	76
	Kay, J. ...	Doodlakine and Baandee	Gluyas Early	24	16	12	13	7	72
6	Richards, T.	Royal ...	Nabawa ...	34	18	14	14	8	88
	McLean, J....	Royal ...	Nabawa ...	29	18	14	14	8	83
7	Nichols, R....	Kulin ...	Nabawa ...	30	19	13	13	8	83
	Roberts Bros.	Kulin ...	Hard Federation	28	18	14	12	8	80
8	Parkinson, A. W.	Gnowangerup	Yandilla King	40	19	13	13	9	94
	Murray, G.	Gnowangerup	Nabawa ...	35	18	14	14	8	89
	Clifford, M.	Royal ...	Federation	29	17	13	14	7	80

ROYAL SOCIETY ZONE AWARDS.

The Final Awards in each Zone have been made and are as follows:—

Zone.	Competitor.	Address.	Society.	Variety.	Total point.	Place.
1	Bothe, B. D. ...	Coorow	Royal	Nabawa	90	1st
	Hebiton, J. K. ...	Three Springs ...	Royal	Merredin ...	82	2nd
2	Martin, K. J. ...	Dalwallinu ...	Dalwallinu ...	Ford	81	1st
	Harris, W. M. ...	Dalwallinu ...	Dalwallinu ...	Nabawa	77	2nd
3	Threfall, G. ...	Korrelocking ...	Wyalkatchem	Nabawa	90	1st
	Ferries, H. C. ...	Wyalkatchem ...	Wyalkatchem...	Nabawa	86	2nd
4	Reynolds, A. G....	Mukinbudin ...	Nungarin ...	Gluyas Early ...	88	1st
	Young, G. T. ...	Talgomine ...	Nungarin ...	Gluyas Early ...	86	2nd
5	Rowan, C. ...	Korbel	Merredin ...	Nabawa	85	1st
	Pollock, R. ...	Korbel	Merredin ...	Nabawa	84	2nd
6	Richards, T. ...	South Caroling ...	Royal	Nabawa	88	1st
	McLean, John ...	County Peak ...	Royal	Nabawa	83	2nd
7	Nichols, R. ...	Kulin	Kulin	Nabawa	83	1st
	Roberts Bros. ...	Kulin	Kulin	Hard Feneration	80	2nd
8	Parkinson, A. W.	Gnowangerup ...	Gnowangerup...	Yandilla King ...	94	1st
	Murray, G. ...	Borden	Gnowangerup...	Nabawa	89	2nd

LEADING COMPETITORS FOR ROYAL SOCIETY'S SPECIAL PRIZE FOR HIGHEST YIELD IN ANY ZONE.

Zone.	Competitor.	Address.	Variety.	Calculated Yield.
				bushels.
8	Parkinson, A. W. ...	Gnowangerup	Yandilla King	40
1	Bothe, B. D. ...	Coorow	Nabawa	39
8	Murray, G.	Borden	Nabawa	35
4	Reynolds, A. C. ...	Mukinbudin	Gluyas Early	35
8	Davies, N. L. P. ...	Borden	Nabawa	34
5	Rowan, C.	Korbel	Nabawa	34
6	Richards, T.	South Caroling	Nabawa	34
3	Trelfall, G.	Korrelocking	Nabawa	34
8	McDonald, J. ...	Gnowangerup	Nabawa	33
5	Smith & Sons	Yarding	Gluclub	33
8	White, A. J. ...	Pallinup	Walker's	33
4	Young, G. T. ...	Talgomine	Gluyas Early	33
3	Ferries, H. C. ...	Wyalkatchem	Nabawa	32
5	Pollock, R.	Korbel	Nabawa	32
5	Prowse, Bros. ...	Doodlakine	Nabawa	32
5	Johnson, W. D. ...	Bruce Rock	Nabawa	31
3	Lindsay, J.	Wyalkatchem	Nabawa	31
3	Payne, Mrs.	Korrelocking	Merredin	31
4	Williams, F. A. ...	Nungarin	Nabawa	31
1	Hebiton, J. K. ...	Three Springs	Merredin	30
2	Martin, K. J. ...	Dalwallinu	Ford	30
7	Nichols, R.	Kulin	Nabawa	30

The Season.—In March very heavy general rains were experienced over the whole of the wheat belt. This caused the weed seeds on the fallow to germinate readily. The subsequent growth was destroyed by cultivation, and in some cases sheep were utilised to check their growth, so enabling the cultivators to do more effective work.

This cultivation forming a mulch, in addition to destroying weeds, also assisted to conserve moisture.

Following on the March rains, the rainfall during the growing period (May-October), although light, was regular and sufficient until towards the end of August.

During the growing period the climatic conditions were ideal for the growth of the wheat plant. Clear, frosty nights were experienced in most districts: this prevented flaggy growth and encouraged the plants to stool out better. Under these conditions, the development of the disease Septoria was retarded, and although it was present in some of the crops, it was in a mild form, and little or no damage was caused.

However, the weather conditions during October were favourable for the disease stem rust. This disease was noticed in all districts to a greater or lesser degree, and in some districts it was in epidemic form and considerable loss resulted.

Entries.—The total number of competing crops inspected was 100 as compared with a similar number last year. Of these 13 were entered direct with the Royal Agricultural Society and the remainder with the local district Agricultural Societies. Exclusive of the Royal Agricultural Society, 10 district Agricultural Societies were represented. The work of these Societies is undoubtedly commendable for stimulating district pride and rivalry along the most desirable lines.

Fallowing.—Both the disc and mouldboard type of plough were favoured for the initial operation, but in this connection it is pointed out that the nature of the soil is one of the deciding factors as to which type of implement is to be used. The important point, however, is to do the work thoroughly, no matter what type of implement is used.

The average depth of ploughing was from three to four inches. Most of the competitors' aim was to complete this operation as early as possible, the majority commencing in June or July. The results of an experiment carried out at the Merredin Experiment Farm have shown that early fallowed land returns, on the average, better yields than the late fallowed land. In this experiment, over a period of three years, the June fallowed plots yielded an average of 5 bushels 4lbs. more per acre per year than those fallowed during the last week in August.

There was also a marked similarity in the methods adopted in connection with the cultivation of the fallow, the object being to conserve the moisture, destroy weed growth, and consolidate the seed bed. The springtyne cultivator was generally favoured for general cultivation of the land, but where the land had become hard or weedy the disc cultivating plough was used.

Varieties.—The most popular variety was "Nabawa," with which 50 of the competition crops were planted. This standard midseason variety has proved a consistent yielder over a number of years, and the fact that it was entered by half the total number of competitors shows that it has the confidence of the leading wheat farmers of this State. Fifteen competitors planted the standard early variety "Gluyas Early."

The variety "Merredin" was planted by eight of the competitors, and the standard late variety "Yandilla King" by five. The variety "Gluyas Late" was planted by four, "Newman's Early" and "Hard Federation" by three, "Gresley" and "Onas" by two, "Ford," "Golden King," "Caliph," "Bald Early," "Gluclub," " Walker's," "Turvey" and "Federation" were grown by one each.

Time of Seeding.—The period during which the various crops were planted extended from the end of April to the first week in June.

The following table shows the times at which the crops in the various zones were planted:—

Zone.	Number of Competitors.	Number of Competitors planting during—				
		End of April.	1st fortnight in May.	Middle of May.	Last fortnight in May.	Beginning of June.
No. 1	6	1	...	4	1	...
No. 2	10	1	3	5	1	...
No. 3	24	5	8	6	3	2
No. 4	12	3	3	6	...	...
No. 5	28	8	11	2	7	...
No. 6	3	...	1	...	2	...
No. 7	8	2	4	1	1	...
No. 8	9	...	3	2	3	1
Total ...	100	20	33	26	18	3

77 of the Competitors planted during the month of May. Of these 59 planted during the period extending up to the middle of the month.

Where the area to be sown does not permit of the whole of the crop being planted in May, planting in April with suitable varieties is favoured rather than extending the seeding period into June.

Rates of Seeding.—The quantities of seed planted per acre varied from 33lbs. to 75lbs. The table hereunder shows the rates employed in the different zones:—

Zone.	Number of Competitors.	Number of Competitors using—			
		Under 45 lbs.	45 lbs.	45-60 lbs.	Over 60 lbs.
		per acre.	per acre.	per acre.	per acre.
1	6	...	1	5	...
2	10	...	2	8	...
3	24	1	6	14	3
4	12	3	7	2	...
5	28	...	15	13	...
6	3	1	...	2	...
7	8	...	...	8	...
8	9	1	2	4	2
Totals	100	6	33	56	5

The competitors in the later maturing districts favoured the heavier rates of seeding up to a bushel per acre being planted, while those in the earlier districts favoured a lesser amount.

Fertilisers.—The fertiliser applied by all competitors was superphosphate, the rates of application varying up to 175lbs. per acre. The average amount used by all competitors was 86lbs. per acre.

The table hereunder indicates the quantities and average amount used in each zone:—

Zone.	No. of Competitor.	Number of Competitors using—						Unknown.	Average Rates in lbs. per acre.
		Under 60 lbs.	60-69 lbs.	70-79 lbs.	80-89 lbs.	90-99 lbs.	Over 100 lbs.		
		per acre.	per acre.	per acre.	per acre.	per acre.	per acre.		
1	6	...	1	...	1	2	2	...	123
2	10	1	2	3	1	2	1	...	69
3	24	...	2	3	2	11	5	1	90
4	12	...	1	4	3	2	2	...	81
5	28	...	3	2	3	15	4	1	86
6	3	...	...	1	...	...	2	...	101
7	8	...	2	...	3	1	2	...	85
8	9	...	2	1	2	2	2	...	87
	100	1	13	14	15	35	20	2	86

Treatment of the Seed.—12 competitors graded the seed with which their competition crops were planted, 20 recleaned by means of a harvester, and eight planted ungraded seed. It is indicative of good farming methods that the majority of the competitors do not overlook the important operation of grading their seed.

The dry method of pickling seed wheat has gained favour with those who entered in these competitions, no less than 75 per cent. safeguarding their crops against ball smut by this method, while, of the remainder, nine used the wet methods of pickling. Of the 16 competitors who did not treat their seed, three considered that pickling their seed plots the previous year was sufficient.

Diseases.—Although reliable preventative methods are available for the prevention of the disease ball smut, there are still some farmers who are unable to prevent this disease.

In twelve of the crops inspected ball smut was present. The most of these were only slightly affected, but there was one instance where the crop was so affected as to cause serious loss both in yield and in market value of the grain harvested.

As mentioned before the crops inspected were, generally speaking, free from smut, although a few badly infected crops were noticed. The most popular method of treating the seed for the prevention of smut is the dry method with copper carbonate; when correctly applied this method is effective in preventing the disease, it also has the additional advantage that the seed can be treated immediately after harvest, and when treated the copper carbonate acts as a preventive against vermin. Although the majority of the competitors adopted the dry method, all of those who used it were not successful. The highly satisfactory results which many have obtained with this treatment indicate that failure with it is due to some defect in the methods of treating the seed. Effective results can only be obtained when the seed is dusted thoroughly with the powder. Those using the machines for treating the seed are sometimes inclined to treat the work as a "rush" job, and in consequence the grain is not covered as thoroughly as it should be.

The disease, Flag Smut, was noticed in several of the crops. It is more difficult to control than Ball Smut or Bunt, because the disease is transmitted through soil infection and distributed as a result of the spores on the foliage of the wheat plant being blown about. Fortunately, "Nabawa" is resistant to this disease, and to control this disease it is advisable to plant resistant varieties. As an additional precaution, and particularly when resistant varieties are not available or are unsuitable for the special climatic conditions, the land for the next crop should be fallowed in the early winter months—June and July—and all weed growth which may appear on the fallowed land destroyed either by sheep or by cultivation. It is also advisable, where possible, to grow a crop of oats between the two crops of wheat.

Some crops were also attacked by the disease "Take-all." Unfortunately, no variety as yet is known to be resistant to this disease, and its control, therefore, depends entirely on the farming practice adopted. Suitable methods for the control of "Take-all" are similar to those already recommended for the control of Flag Smut. In addition, planting as late as is safe in the sowing period is beneficial. Early fallowing and late sowing should, therefore, be the methods adopted to control this disease.

The spores of the disease "Rust" (*Puccinia graminis*) are present in the crops every year, but unless the climatic conditions are favourable it does not develop sufficiently to cause serious damage.

This year, however, the mild humid conditions which prevailed during the early part of October in some districts, particularly in the Northern and Great Southern portion of the Wheat Belt, favoured the development of this disease.

The control of this disease can only be attempted by planting the most resistant or escaping varieties. Both Nabawa and Gluyas Early are useful varieties for this purpose. The variety Yandilla King was considered rust resistant, but in view of the experience this year, it must be considered as a rust escaper.

Evidently in previous years when the conditions were favourable for the development of this disease, this variety was not at a stage of its growth when it was susceptible to the disease, and so escaped infection.

The Yields.—The desire to farm along secure and tried lines was very much in evidence. This, together with the favourable conditions throughout the Wheat Belt in 1927, has considerably raised the standard of competition crops. The average calculated yield for all crops inspected was 26.9 bushels against the average of 24.5 bushels the previous year.

The table hereunder shows the average calculated yields for the different zones.

Zones.	Number of Competitors.	Average calculated yield.
		bushels.
1	6	28·0
2	10	22·4
3	24	25·6
4	12	29·2
5	28	26·2
6	3	29·0
7	8	25·6
8	9	32·0

The high calculated yields and the excellence of the majority of the wheat crops inspected is pleasing, and it is particularly desirable that the efforts of those who carefully prepared their land and seed in anticipation of the competition and of receiving a good crop generally will stimulate others to do likewise. Buoyed as we are by the wheat yield of 1927 we have still to remember that the test of efficient farming comes when our season is least favourable.

SUCCESSFUL CODLIN MOTH CONTROL IN WESTERN AUSTRALIA.

GEO. W. WICKENS,

Superintendent of Horticulture.

Western Australia, with an area of apples and pears aggregating 11,022 acres, is unique amongst the apple and pear producing countries of the world in the freedom of its orchards from one of the most destructive insect pests affecting pome fruits—Codlin Moth (*Carpocapsa pomonella*)—and this article is written to show, first, that this freedom is only attained by constant vigilance and effective action; and second, the need for a continuance of these protective measures.

In 25 years—1903 to 1928—there have been eleven outbreaks of Codlin Moth in Western Australia, and our fruitgrowing friends in the other States find it very difficult to believe that these outbreaks are each time really due to a fresh introduction of the pest from outside the State, and not to a natural spread of the insects within the State itself. But to anyone who is familiar with the habits of Codlin Moth and its ability to reproduce its species with great rapidity, it need only be stated that in spite of the fact of the eleven outbreaks quoted above over 99 per cent. of the area under apples and pears in Western Australia has never been affected from date of planting, and this could not be possible if the pest was continuously in the State for a period of 25 years.

In the various infestations which have occurred there have been two distinct features—those between 1903 and 1913, five in number, all occurring in city and town properties, four in Perth and one in Albany; and the remaining six from 1913 onwards all appearing in orchard districts.

The measure adopted in eradicating the pest at Perth was a destruction of the whole of the apples and pears as well as the trees in the infested area—the small value of these non-commercial places rendering total destruction the best method to adopt.

At Albany (also a non-commercial area) all pears and apples in the infested places were destroyed, and all large trees were cut back so hard that practically no fruit was borne by them the following year.

No recurrence of the pest has occurred in Albany since 1904 and none in Perth since 1913.

In season 1913-14 the first outbreak in a commercial orchard occurred at Katanning, and it was obvious in a country district (which although not one of the principal fruitgrowing areas of the State, nevertheless contained a fair number of orchards) that the destruction of all fruit liable to become infested together with the trees would not be reasonable if other measures of control could be adopted, and the ordinary routine practice of spraying, bandaging, attention to windfalls and destruction of infested fruit, etc., was carried out with entire success, the pest being stamped out of the district in the following season (1914-15), after two seasons' treatment, and it has not been seen at Katanning nor within 50 miles of there since that time.

In season 1915-16 Codlin Moth made its appearance at Bridgetown in a commercial orchard 30 acres in extent, in the centre of one of the best apple districts in the State. This outbreak had a greater potentiality for mischief than any that have occurred up to the present time, for within a radius of three miles from the infested place there were 1,100 acres of orchards, mostly apples, and the planted area near Bridgetown has been greatly increased since then. Fortunately, the pest was discovered before it had time to spread, and it was eradicated in one season by the same methods as those employed at Katanning, and no trace of the pest has been seen in the Bridgetown district nor within 50 miles of there since that time.

The unwelcome visitor next made its presence known in an orchard at Caversham in season 1918-19. This time the pest had chosen for its home the centre of the principal vineyard area of the State where apples and pears are only grown in small quantities as side lines; it was stamped out by spraying, etc., in that and the following season, and has not been seen within 50 miles of that district since.

The next outbreak occurred at North Dandalup in season 1924-25—a period of six years since the last appearance—and again the good fortune was experienced of discovering it before it had spread to more than one orchard, and it was stamped out by the usual treatment during that and the following season, and has not since been seen within 50 miles of North Dandalup. The reason for specially mentioning 50 miles in each of the instances quoted above is to show, if further proof were needed, that these various infestations are fresh introductions, and are not the result of the pest spreading outward from an infested area within the State.

In December of 1925 the most violent infestation, so far as numbers are concerned, was discovered at Collie in small gardens planted around residences in the town. It is no exaggeration to state that caterpillars of Codlin Moths were present in thousands, some heavily laden apple trees carrying scarcely one non-infested fruit or fruit from which a caterpiller had not emerged; even Japanese plums were found to be infested.

Within the town boundary there are approximately 300 of these small places, 81 of which were infested. Outside the town boundary, but within three miles of the town, there are approximately 50 more places planted with fruit trees, 20 being semi-commercial orchards, ranging from two to seven acres in extent, and three of these were infested. Outside these again there are commercial orchards a few miles apart until the thickly planted orchard district at Preston is reached. Under these circumstances it was apparent that destruction of fruit and trees would not be the best method of dealing with the pest in Collie, for this action might easily lead to driving the moths, when they emerged from the pupae stage, further afield to find a suitable place to deposit their eggs, for, as stated above, many larvae had left the fruits before the pest was discovered, and obviously these could not be destroyed by destruction of fruit and trees.

The fact that the fruit and trees were not destroyed is specially mentioned here because a deputation comprising some of the principal apple growers of the State waited upon the Hon. Premier, Mr. Collier, and requested that as the pest had appeared mainly in what are known as "backyard gardens" so close to some of the principal apple districts of the State, the only safe treatment was to destroy both fruit and trees.

In connection with the request preferred by the deputation two things are worthy of note. The first is that when the departmental viewpoint was placed before the growers they showed such confidence in the judgment of the officers concerned that not a single further protest was raised. The second point is that the officers concerned were sufficiently confident of their ability to handle the outbreak without resorting to devastation, and also that devastation was not the safe method under existing conditions, that they were prepared to take the risk of the obloquy attached to failure. For it can be readily understood if failure had resulted, and the pest had obtained a permanent footing, the opinion would have been strongly held, and freely expressed, that if the Department had taken advice given by growers the pest would have been stamped out.

It will be of interest to mention here the steps taken by the Department to eradicate the pest in the Collie district and so that an understanding may be gained of the powers provided to deal with such matters, two sections of the "Plant Diseases Act"—one providing for instances when disease is found, and the other to prevent the spread of disease even though no disease is actually present—are quoted, as follow:—

Section 10 :

(1) Whenever an inspector is satisfied that disease exists on any orchard, land or premises, he may by requisition to the owner and occupier or either of them require them or him to do whatever is necessary in order to eradicate such disease from such orchard, land or premises, and to prevent the spread thereof, and the requisition may specify any particular steps which the inspector requires to be taken.

(2) Such requisition may name a time by which the doing of anything thereby required shall be commenced and a time within which it shall be completed.

(3) The owner and occupier, jointly or severally, or the owner or occupier, as the case may be, shall be responsible for due compliance with the requisition, and shall do everything thereby required to be done.

Penalty: One hundred pounds.

(4) In case of any default in compliance with the terms of the requisition, any inspector may do or cause to be done all such things as may be necessary in order to carry the terms of the requisition completely into effect, and the expenses incurred in and about so doing shall be recoverable from the person or persons guilty of the default.

Section 14 :

(1) An inspector may, with the approval of and subject to an appeal to the Minister, serve on the occupier and owner of any orchard or place where any plant is growing, or on either of them, a notice requiring them or him to take any measures or do any acts which the Inspector may deem necessary to prevent the spread of any disease, and in such case, even although the orchard or place is not infected, any person on whom any such notice is served shall, as soon as practicable after the receipt thereof comply with the requisitions thereof.

(2) In the event of notice being served on both the owner and occupier, they shall be jointly and severally liable to perform the requisitions thereof.

(3) In case of any default in compliance with the terms of the notice any inspector may do or cause to be done all such things as may be necessary in order to carry the terms of the notice completely into effect, and the expenses incurred in or about so doing shall be recoverable from the person or persons guilty of the default.

An area within a circle having its centre at the Collie Post Office, and a radius of three miles, was taken under departmental control. All the necessary work, spraying, bandaging, etc., in the small places in the town was carried out departmentally, and notices of instructions were issued to those outside the town boundaries, who, whether their orchards were infested or not, were obliged to carry out the work at their own expense.

As these notices show the procedure adopted for stamping out the pest a copy of the one issued to occupiers of infested orchards is here quoted, and the only difference between it and the one issued to occupiers of non-infested orchards is the enforcement of five sprayings in the former case and four sprayings in the latter.

DIRECTIONS FOR TREATMENT.

"All apple, pear and quince trees must be sprayed five times with Arsenate of Lead, using 3lbs. Arsenate of Lead paste or 1½lbs. Arsenate of Lead powder in 50 gallons of water.

The first spraying must be applied just when the petals of the blossoms commence falling.

The second spraying must be applied 10 to 12 days after the first spraying.

The third spraying must be applied 14 days after the second spraying.

The fourth spraying must be applied six weeks after the third spraying.

Fifth spraying must be applied fourteen days after the fourth spraying.

All loose bark must be scraped from off the trunks of all apple, pear, and quince trees.

The trunks of all apple, pear and quince trees must be bandaged with strips of bagging or other suitable material six inches in width. After 1st November these bandages must be taken off and examined once every ten days, replacing bandages immediately after examination. All larvae of Codlin Moth found in the bandages and upon trunks of trees underneath the bandages must be destroyed.

All fallen fruit must be picked up daily and all infected fruit must be boiled.

The land in the orchard must be kept well cultivated and free from all rubbish and weeds.

Before any fruit leaves the orchard it must be examined and passed by an Inspector and must be sent only to destinations approved by him."

It will be noted from the date of the discovery of the pest (December, 1925) the season at that time was too far advanced for effective spraying during the season of 1925-26, and though the area was sprayed and bandaging, etc., was carefully carried out, it was not until the following season 1926-27 that a thorough campaign of destruction could be inaugurated.

In that season five sprayings with Arsenate of Lead (powder form) were applied from September to December inclusive, using at the rate of 1½lbs. in 50 gallons of water. Hundreds of eggs were to be seen at time of spraying, and many minute poisoned larvae were observed.

In the season of 1925-26 the larvae caught in the bandages and destroyed when found were far too numerous to be counted. In season 1926-27 in the town area the total number of fully developed larvae found during the whole season only amounted to 30 and the infested places had been reduced from 81 to 13. In the small places and semi-commercial orchards outside the town boundary 53 adult larvae were found during the season.

In the present season 1927-28 exactly the same procedure as last season has been followed and at time of writing, 11th February, 1928, not a single larva has been found in the town; the number of infested places in the whole area has been reduced to one; and in this a weekly search of fruit and bandages has resulted in finding only 13 codlin caterpillars to date.

It will be seen from the above that though the pest is still present in Collie its end is in sight.

In 1926 another outbreak, but much less severe, and the last to date, was discovered at Narrogin. The same procedure as at Collie has been adopted and the number of infested places has been reduced from nine in 1926-27 season to two in 1927-28, and the total number of codlin larvae found in the latter season up to the present, 11th February, 1928, only amounts to 29.

It would be hardly fitting to conclude this article without some reference to what is meant in a saving of actual cash to the State of Western Australia by the absence of Codlin Moth from the orchards. If the pest were prevalent the same as it is in the Eastern States, five sprayings would be needed annually, and as our apples are not affected with Scab (*Venturia inequalis*) the spraying would have to be carried out for codlin alone, and not as in the East where some dual purpose sprayings are applied at one time for scab and codlin, so the cost would be attributable to one pest only.

In addition to spraying, all apple and pear trees would have to be bandaged and these bandages regularly examined throughout the season.

All fallen fruit would have to be gathered from the ground at frequent intervals and all infested fruit destroyed by boiling.

A conservative estimate for spraying five times in a season, with the extra work outlined above, is £4 per acre per annum.

The area under bearing apple trees in Western Australia amounts to 7,496 acres, and this would mean at £4 per acre an annual cost of £29,984.

Pears are omitted from this estimate because scab (*Venturia pyrina*) affects this class of fruit in Western Australia, and some of the necessary codlin sprays could be applied at the same time as those now carried out for the control of scab, but an added cost would be incurred in the purchase of arsenate of lead, and in the extra sprayings necessary to control codlin over those used in this State against Pear Scab.

In addition to the actual outlay mentioned above the loss due to infested fruit must also be taken into account. The average annual crop of apples in Western Australia approximates 650,000 cases, and the average annual crop of pears 88,000—a total of 738,000 cases. In countries where codlin moth has made a permanent home control measures which result in 90 per cent of clean fruit are looked upon as good; 95 per cent. is considered excellent and rarely attained. Assuming that Western Australia would achieve the higher result, the loss due to infested fruit would amount to 5 per cent. of 738,000 cases, or 36,900 cases annually. These at 7s. 6d. per case would mean a monetary loss to the State in round figures of £13,900.

The direct annual loss, therefore, from money expended in control measures plus the loss due to infested fruit, would amount to £43,784 without taking into consideration the expenditure incurred in treating pears.

It is worthy of note that the sum mentioned would be sufficient to pay all expenses now incurred in connection with the Fruit Branch of the Agricultural Department for a period of six years.

The earlier portion of this article has shown the necessity for vigilance and efficiency; the latter demonstrates the losses to be expected if codlin becomes permanently established in the apple and pear orchards of the State; there is a reason for stressing the possible loss at the present time and it is this:—Western Australia will harvest in 1928 the lightest apple crop produced for many years past, one that perhaps will not be much in excess of the quantity required for use within the State. This may mean that later in the season if apples become dear in the retail shops and barrows the general purchasing public who are not fully cognisant of the full details of the case may agitate for the introduction of apples from the Eastern States, where a bumper crop is being gathered, and which both Commonwealth and State Regulations at present prohibit from being sent to Western Australia.

A perusal of the above will surely convince any genuine West Australian of the wisdom of continuing the prohibition now in force.

This article would not be complete without paying a tribute to the great assistance rendered by growers to the Department in a combined effort to keep the State free. Though the instructions have often been both irksome to receive and expensive to carry out, a ready response has always been forthcoming, and not only this, but the growers have done inestimable service in notifying the Department of the presence of the pest—Collie, Narrogin, and North Dandalup all fall within that category, and it is only this happy combination of growers and officers that has made it possible to head this article "Successful" after experiences covering a quarter of a century.

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SPOTTED WILT OF TOMATOES.

W. M. CARNE, F.L.S.,
Botanist and Plant Pathologist.

This disease is the principal bane of tomato growers in this State, especially in the spring and early summer crops. In many districts, both here and in New South Wales, Victoria, and South Australia, it is almost impossible in some years to raise commercial spring-sown crops in the open. Fortunately in this State the Geraldton area is relatively free.

The names Wilt and Blight given to this disease in this State are misleading. There are several other wilt diseases, the most common being one which occurs in the summer and is caused by a fungus attacking the bases of the stems. It may be recognised by the lower leaves turning yellow, becoming brittle and folding upward. The term Blight is applied to many diseases.

In Spotted Wilt the disease appears as dark, bronzy markings on the surfaces of the youngest leaves. Affected leaves finally die. The stems may develop dark streaky marks. The fruits either fail to develop properly or ripen in a more or less mottled fashion.

It has for some time been evident that Spotted Wilt probably belonged to the virus group of diseases. In diseases of this type an infective principle (which is not recognisable microscopically) is carried in the plant juices. Insects are the main cause of the transmission of a virus from an infected plant to a healthy one. They are usually small and feed by sucking the plant juices. Experiments in Victoria and New South Wales supported the idea that the disease was caused by a virus. In 1927 this was definitely confirmed at the Waite Agricultural Research Institute in South Australia. Working under the auspices of the Council of Scientific and Industrial Research, Mr. H. A. Pittman, B.Sc.Agr., demonstrated that Spotted Wilt was a virus disease conveyed from plant to plant by the common thrips (*Thrips tabaci*). He also confirmed the finding of other workers that there is no evidence of infection being carried in pruning or in the seed or soil. The disease appears some sixteen to twenty days after the plants are infected by the thrips. It is not known to attack other than tomato plants.

Control.

Up to the present no definitely satisfactory methods for controlling Spotted Wilt are available for tomato crops grown in the open.

The following recommendations are made on general principles:—

1. At least one month should elapse each year during which no tomato crops are alive on any area. All old plants should be removed and burnt. The object is to remove any chance of infected plants of the summer crop becoming sources of infection in the spring crop or *vice versa*.

2. Destroy infected plants as soon as detected. Owing to the disease taking sixteen to twenty days to become apparent, it is evident that the destruction of infected plants is not to be relied upon as an effective measure.

3. Save the seed of apparently resistent plants. Many disappointments may arise from sowing the seed of such plants. However, the small egg and cherry tomatoes are very resistant and there is always the possibility of finding better plants which transmit their resistance to their offspring. A tomato of good commercial qualities and resistant to this disease would be of outstanding value.

DISTRICT CROP COMPETITION—YILGARN AREA.

Judge: G. K. STEVENS, Manager, Yilgarn Expt. Farm.

Arising from a suggestion of the Director of Agriculture on the occasion of his visit to that area during July, 1927, the West Bullfinch Primary Producers' Association organised a crop competition amongst the Associations of the adjoining areas in the Yilgarn district. Except that the areas of the competing crops were each ten acres and the crops on unfallowed land were eligible to compete, the conditions governing the competition were similar to those governing the Royal Agricultural Society crop competitions. Three Associations were represented, namely, those of West Bullfinch, North-East Bullfinch, and Corinthia.

This is the first competition of its kind conducted in this area, and it was pleasing to note the enthusiasm and friendly rivalry among the competitors. The West Bullfinch Association is to be congratulated on its organising such a successful competition.

W. Bamber's Winning Crop of Gluyas Early.

A perusal of the tabulated awards made will indicate the high standard obtained in all these districts.

WEST BULLFINCH CROP COMPETITION—(10 ACRES).
Judge: G. K. Stevens, Manager, Yilgarn Experiment Farm.

Competitor.	Variety.	Yield. 40 points.	Freedom from Weeds. 20 points.	Freedom from Disease. 15 points.	Freedom from Admixture. 15 points.	Evenness of growth. 10 points.	Total. 100 points.
Bamber, W.	Gluyas Early ...	35	17	14	12	8	86
Cass-Smith, W. P. ...	Gluyas Early ...	33	18	13	13	8	85
Copley, C.	Gluyas Early ...	33	18	13	12	8	84
Berrey, W.	Gluyas Early ...	33	18	14	12	7	84
Copley, T. B. ...	Gluyas Early ...	31	18	13	12	9	83
Davies, C. R. ...	Nabawa	32	18	13	11	7	81
Bacon, W.	Nabawa	32	18	13	11	7	81
Yule, G.	Gluyas Early ...	33	17	11	11	9	81
Jukes, J.	Gluyas Early ...	30	18	14	11	7	80
Godfrey, F. H. ...	Gluyas Early ...	29	18	14	11	8	80
Duncan, R.	Nabawa	26	18	13	13	8	78
Jukes, J.	Gresley	27	18	12	12	7	76

NORTH-EAST BULLFINCH CROP COMPETITION—(10 ACRES).

Judge G. K. Stevens, Manager, Yilgarn Experiment Farm.

Competitor.	Variety.	Yield. 40 points.	Freedom from Weeds. 20 points.	Freedom from Disease. 15 points.	Freedom from Admixture. 15 points.	Evenness of growth. 10 points.	Total. 100 points.
Chapman, H.... ...	Gluyas Early ...	37	18	14	14	9	92
Mann, J.	Gluyas Early ...	29	16	14	14	9	82
Reynolds, H. ...	Gluyas Early ...	27	17	14	13	8	79
Cox, H. C.	Gluyas Early ...	29	18	12	12	8	79
Kelly, R.	Nabawa	25	16	14	14	8	77
Southern & Clayton ...	... ...	25	18	14	12	8	77
Mann, J.	Nabawa	28	15	13	12	7	75
Hoffmann, O. A. ...	Gluyas Late ...	26	16	14	12	7	75
Hoffmann, O. B. ...	Gluyas Late ...	23	17	14	13	8	75

W. P. Cass Smith's competing crop, West Bullfinch (Gluyas Early).

CORINTHIAN CROP COMPETITION—(10 ACRES).

Judge: G. K. Stevens, Manager, Yilgarn Experiment Farm.

Competitor.	Variety.	Yield. 40 points.	Freedom from Weeds. 20 points.	Freedom from Disease. 15 points.	Freedom from Admixmixture. 15 points.	Evenness of growth. 10 points.	Total. 100 points.
Leckey, J.	Gluyas Early ...	35	17	13	12	9	86
Davies, F. & J. ...	Gluyas Early ...	32	18	14	13	8	85
McKay, D.	Gluyas Early ...	32	17	12	13	8	82
Stopher, R.	Gluyas Early ...	26	16	14	12	8	76

INTERDISTRICT 10 ACRES CROP COMPETITION—BULLFINCH AREA.

Representatives from District Crop Competitions.

Competitor.	District.	Variety.	Yield. 40 points.	Freedom from weeds. 20 points.	Freedom from Disease. 15 points.	Freedom from Admixture 15 points.	Evenness of growth. 10 points.	Total 100 points.
Chapman, H. ...	N.E. Bullfinch	Gluyas Early	37	18	14	14	9	92
Bamber, W. ...	West Bullfinch	Gluyas Early	35	17	14	12	8	86
Lecky, J. ...	Corinthian ...	Gluyas Early	35	17	13	12	9	86
Cass-Smith, W. P.	West Bullfinch	Gluyas Early	33	18	13	13	8	85
Davies, F. & J.	Corinthian ...	Gluyas Early	32	18	14	13	8	85
Mann, J. J. ...	N.E. Bullfinch	Gluyas Early	29	16	14	14	9	82

The excellent season experienced no doubt was responsible to a large extent for the high yields, some of the crops being calculated to yield up to 36 bushels per acre. Although pioneering methods were generally adopted by the competitors, credit must be given for the thorough manner in which the various operations were carried out. It is to be hoped that the results obtained this year will not mislead those interested and cause them to overlook the experience of the previous two years, and that the successful production of wheat depends on the employment of up-to-date methods.

As mentioned above all the crops were of a high standard, the winning crop of Mr. H. C. Chapman being particularly creditable. This was part of 70 acres of Gluyas Early planted on fallow during the third week in May. The land was prepared by being ploughed with a Sundercut plough during the previous August to a depth of 3 inches. This was springtyne cultivated before seeding after the March rains and planted with a combined cultivating drill crossing the previous cultivation. It was sown at the rate of 40lbs. of ungraded seed to the acre with an equal amount of superphosphate.

The crop was even in height and well stooled, the heads being uniform, large and well filled; the crop judged showed remarkable freedom from weeds, disease and admixture. The seed was from a crop sown the previous year with seed from the Merredin Experiment Farm.

Other crops worthy of note were those of Messrs. Cass-Smith, Bamber, Copley, Yule, Berry, and F. & J. Davies, all of the variety Gluyas Early. That of Mr. Bamber lost points due to spaces missed with the drill when planting and that of Mr. Yule owing to the amount of ball smut present. The crops, generally, were fairly free from disease. Traces of Septoria, however, were noticed, and in three crops only was the disease ball smut noticed. The presence of this latter disease is not excusable, as the up-to-date dry method now available for its prevention is reliable and convenient.

The cultural details, together with the rainfall for 1927 as officially recorded at Bullfinch and West Bullfinch, are set out hereunder:—

District.	Jan.	Feb.	March.	April.	Growing Period.							Nov.	Dec.	Total for Year.
					May.	June.	July.	Aug.	Sept.	Oct.	Total.			
Bullfinch ...	19	45	625	62	113	210	174	108	315	28	943	22	20	1,786
West Bullfinch ...	3	33	638	48	90	194	209	85	304	37	919	11	23	1,675

WEST BULLFINCH CROP COMPETITION.

Competitor.	Cass Smith.	Davies, C. R.	Bacon, W.	Godfrey, F. H.	Duncan, R.	Bamber, W.
Years cropped fallowed	New land	New land	New land	New land	Second crop	New land
Timber ...	Gimlet and Salmon	Gimlet and Salmon	Salmon and Gimlet	Salmon, Gimlet, Mallee,	Salmon, Gimlet, Morrell	Salmon and Gimlet
Ploughed ...	Nil Cultivated	Nil	Nil	Nil	Nil	Nil
Type of Plough	...	...	...	...	...	...
Depth ...	...	...	...	...	...	...
Condition of land at time of ploughing	...	...	...	...	...	...
Other cultivations	First after 6in. rain in Mar. 2nd after 50 points in May Drilled with combine	One cultivation previous to seeding with a combine.	One cultivation previous to seeding with a combine.	One cultivation previous to seeding with a combine	Cultivated in April, drilled with a combine	One cultivation before seeding with a combine
Variety ...	Gluyas Early	Nabawa	Nabawa	Gluyas Early	Nabawa	Gluyas Early
Planted ...	May 16th	May 1st	May 4th	May 10th	April 21st	...
Rate of Seed	30lbs.	30lbs.	30lbs.	30lbs.	27lbs.	33lbs.
Graded ...	Yes	Yes	Yes	Yes	Yes	No
Treated ...	Dry pickled	Dry pickled	Dry pickled	Dry pickled	Dry pickled	Dry pickled
Rate of Super.	52lbs.	60lbs.	60lbs.	50lbs.	60lbs.	42lbs.
Disease ...	Trace of rust	Trace of rust	Trace of rust	Nil	Septoria	Nil

Competitor.	T. N. Copley.	C. Copley.	G. Yule.	F. Berrey.	J. Jukes.	J. Jukes.
Years cropped fallowed	Second crop	New land	Second crop	New land	New land	New land
Timber ...	Salmon and Gimlet	Salmon, Gimlet, Morrell	Salmon and Gimlet	Salmon and Gimlet	Tamar Scrub, Mallee	Salmon, Gimlet, Morrell
Ploughed ...	...	...	...	...	...	...
Type of Plough	...	...	...	...	...	...
Depth ...	...	...	...	...	...	...
Condition of land at time of ploughing ing	...	...	...	...	...	...
Other cultivations	Cultivated in Mar., seeded with combine	Cultivated 1st Apl., seeded with combine	Cultivated in Mar., also in Apl. Seeded with combine	Cultivated in Mar., seeded with combine	Cultivated in Apl., seeded with combine	Cultivated in Apl., seeded with combine
Variety ...	Gluyas Early	Gluyas Early	Gluyas Early	Gluyas Early	Gluyas Early	Gresley
Planted ...	May 10th	May 17th	April 28th	May 24th	May 10th	May 14th
Rate of Seed	30lbs.	30lbs.	40 to 45lbs.	33lbs.	30lbs.	26lbs.
Graded ...	Yes	Yes	Yes	Yes	Yes	Yes
Treated ...	Dry pickled	Dry pickled	Dry pickled	Dry pickled	Dry pickled	Dry pickled
Rate of Super	50lbs.	45lbs.	80 to 90lbs.	43lbs.	60lbs.	45lbs.
Disease ...	Trace of Rust	Septoria	Smut and Trace of Rust	Nil	Nil	Trace of Rust; Septoria most pronounced

N.E. BULLFINCH CROP COMPETITION.

Competitor.	M. Reynolds.	N. Cox.	H. Chapman.
Years cropped fallowed...	New land	New land	First Crop
Timber	Jam and Gimlet	Jam and Gimlet	Salmon and Gimlet
Ploughed	...	...	Yes—August
Type of Plough	...	...	Sundercut
Depth	...	...	3 inches
Condition of land at time of ploughing	...	...	Good
Other Cultivations ...	Cultivated before seeding and crossed with combine	Drilled with Sunder seeder	Fallowed in August cultivated before seeding and cross drilled with combine
Variety	Gluyas Early	Gluyas Early	Gluyas Early
Planted	June 3rd	May 10th	May 17th
Rate of Seed	38lbs.	33lbs.	40lbs.
Graded	No	No	No
Treated	Dry Pickled	Dry Pickled	Dry Pickled
Rate of Super	40lbs.	53lbs.	40lbs.
Disease	Nil	Trace, Smut and Rust	Nil

Competitor.	J. Mann.	J. Mann.	R. Kelly.	O. A. Hoffmann.	O. B. Hoffmann.	Southern & Clayton.
Years cropped Years fallowed	2nd Crop 1st year in July	2nd Crop ...	New land ...	New land ...	New land ...	... ...
Timber ...	Salmon, Gimlet, and Morrell	Salmon, Gimlet and Morrell	Salmon and Gimlet	Salmon and Gimlet	Salmon, Gimlet, and Morrell	...
Ploughed ...	Yes	Yes	...	...	...	...
Type of Plough	Disc	Disc	...	...	...	...
Depth	3½in.	2in.	...	...	...	...
Condition of land at time of ploughing	Good	Good	...	...	...	...
Other cultivations	1. October; 2. Before seeding	Ploughed before seeding	Seeded with Combine	Disc harrowed before seeding	Disc harrowed before seeding	...
Variety ...	Nabawa	Gluyas Early	Nabawa	Gluyas Late	Gluyas Late	...
Planted ...	May 10	May 22	May 4	May 7	May 1	...
Rate of Seed ...	29lbs.	34lbs.	26lbs.	26lbs.	26lbs.	...
Graded ...	No	Yes	No	Yes	Yes	...
Treated ...	Dry Pickled	Dry Pickled	Dry Pickled	Dry Pickled	Dry Pickled	...
Rate of Super.	45lbs.	45lbs.	30lbs.	45lbs.	45lbs.	...
Disease ...	Septoria	Nil	Nil	Nil	Nil	...

CORINTHIAN CROP COMPETITION.

Competitor.	R. Stopher.	F. J. Davies.	J. Leckey.	McKay, D.
Years cropped ...	New land	New land	Second Crop	...
Timber	Salmon and Gimlet	Gimlet	Salmon and Gimlet	...
Ploughed	...	...	...	...
Type of Plough ...	...	...	...	...
Depth	...	...	...	
Condition of land at time of ploughing	...	...	...	...
Other Cultivations	Drilled with Combine	Drilled with Combine	Drilled with Combine	...
Variety	Gluyas Early	Gluyas Early	Gluyas Early	Gluyas Early
Planted	May 10th	May 27th	April 27th	May 17th
Rate of Seed ...	36lbs.	34lbs.	30lbs.	34lbs.
Graded	No	No	Yes	No
Treated	Wet pickled	Dry pickled	Dry pickled	Wet pickled
Rate of Super. ...	60lbs.	80lbs.	45lbs.	44lbs.
Disease	Nil	Nil	Septoria	Smut

THE ORIGIN OF "NABAWA" WHEAT.

(GEO. L. SUTTON, Director of Agriculture.)

"Nabawa" is the result of a selection made at the Chapman Experiment Farm, following upon the crossing of two varieties of wheat—"Gluyas Early" and "Bunyip." The initial step in connection with the production of "Nabawa," namely, the crossing of these two varieties, was carried out at the Wagga Experiment Farm, New South Wales, by Mr. H. J. Hurst, who was then my assistant, when I held the position of Wheat Experimentalist in N.S.W., and was in charge of the wheat breeding work at the Wagga and other experiment farms in that State. The cross was made in 1907. When I was appointed Commissioner for the Wheat Belt in this State, I brought with me a number of unfixed crossbreds, including several strains of the cross referred to. These were planted at the Narrogin School of Agriculture and the Merredin and Chapman Experiment Farms in 1912. The work of making the selections, which resulted in the production of the fixed type eventually called "Nabawa," was carried out by Mr. Charles Orchard, Seedsman at the Chapman Experiment Farm.

As is now well-known, the making of a cross is not all that is necessary in the production of a new variety. The object of crossing two old varieties in order to secure a new and better one is to bring about variation so as to permit the plant breeders to carry out the selection in the desired direction. The making of the cross is, therefore, the initial stage only in connection

with the production of a new variety. As the result of a cross, great variation is often experienced, and from the same cross the selector can very often secure several varieties with characteristics differing entirely from their parents and from each other. "Nabawa" is an apt illustration of this latter, for "Gluyas Early," its mother parent, is an early variety, whilst "Bunyip," its sire, is even earlier, but "Nabawa" is a mid-season variety, later than "Gluyas Early" and considerably later than "Bunyip."

It is reported that in New South Wales a strain of the same cross was fixed, but after the usual trials it was abandoned because it was a poor yielder, and it had no other special characteristics to recommend it. It was evidently quite different to "Nabawa."

At the Chapman Experiment Farm a selection from one of the strains brought from New South Wales showed a remarkable freedom from rust, whilst other varieties, particularly "Federation," which was very popular at that time, were badly attacked. This particular strain was developed, and in 1915 it was found that the desired qualities were fixed and it was then named "Nabawa" after the district in which it was produced.

The strain which was selected in Western Australia and from which was evolved "Nabawa" proved under Western Australian conditions to be either rust resistant or rust escaping, and in view of our lengthy experience now it is probably the former. It has also proved to be a variety of great productivity under many and varied conditions, and, from the reports which are being received from the Eastern States, particularly from New South Wales, it appears to be a good yielder under the same conditions as those under which another selection of the same cross proved to be a poor yielder.

Following the usual practice in this State, the new variety was subjected to severe trials for several years before being distributed to settlers: it was not until about 1919 that it was distributed in any quantity to farmers.

"Nabawa" was one of the first crossbreds fixed and named by the Agricultural Department of this State, and since then it has more than justified the promise which it gave when named, and, now, as is shown by the Government Statistician, it is the most popular variety in Western Australia, approximately half the wheat area in this State being cropped with it. Since its selection and fixing it has also proved to be so highly resistant to Flag Smut as tentatively to be regarded as immune.

From the reports in the Eastern States press the Western Australian strain of "Nabawa" is apparently proving very prolific there, and the fact that it is also resistant to Flag Smut makes it additionally valuable.

Recently it was learnt from Mr. E. C. Mitchell, Inspector of Aborigines, that the meaning of the aborginal word "Nabawa" is "fat yielder," and indicates wealth and abundance. By a happy accident this variety was given a name which foreshadowed its high yielding characteristics.

A FALLOW "SCRAPER."

L. J. H. TEAKLE,
Plant Nutrition Officer.

Although one might well hesitate before suggesting that the farmer use additional machinery under the present conditions of agricultural practice, I beg leave to describe very briefly an implement which has been used to good advantage in certain sections of California.

During a recent trip through part of the wheat belt of this State, I had occasion to visit some thirty farms and inspected the fallows entered for the Agricultural Societies' Competitions. The prevalence of a summer growing

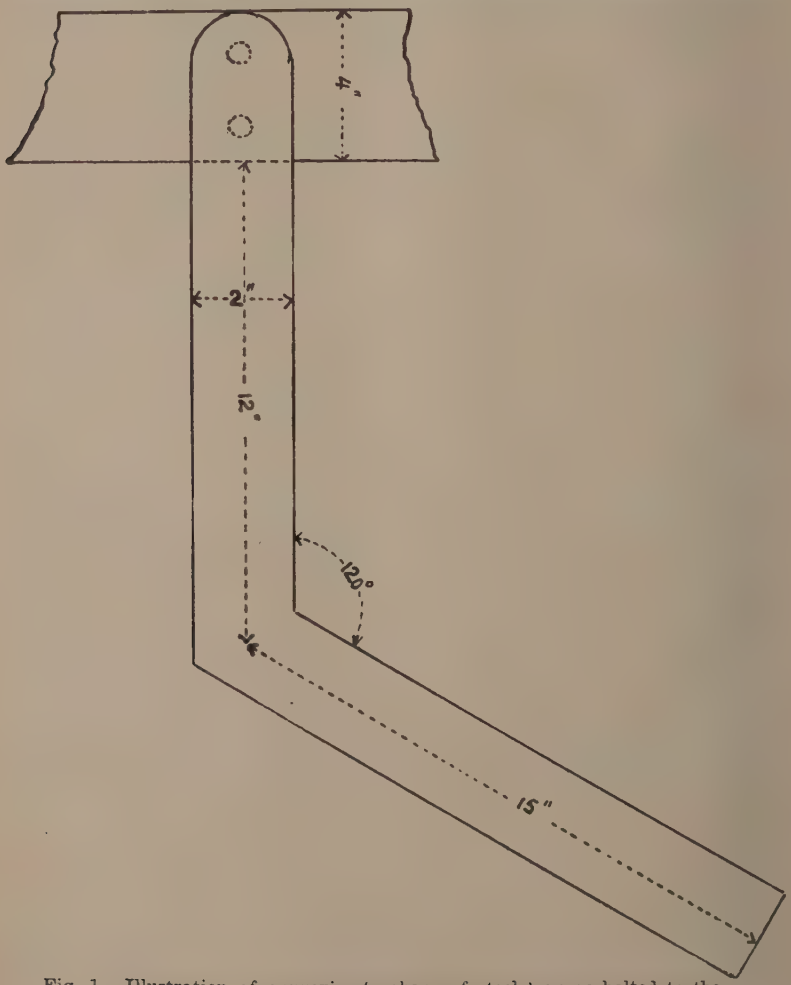

Fig. 1.—Illustration of approximate shape of steel tyne as bolted to the cross bar. Scale 3in. = 1 foot.

weed, Solanum hoplopetalum (known locally under various names such as California Thistle and Summer Thistle), was particularly noticeable, and a few test holes made with the aid of a soil auger showed that it was a moisture robber. The aerial portions of this weed are easily knocked off the root, and now is the time to deal with a potential pest which may spread throughout the wheat belt in the course of a few years. A few "paddy" melons are to

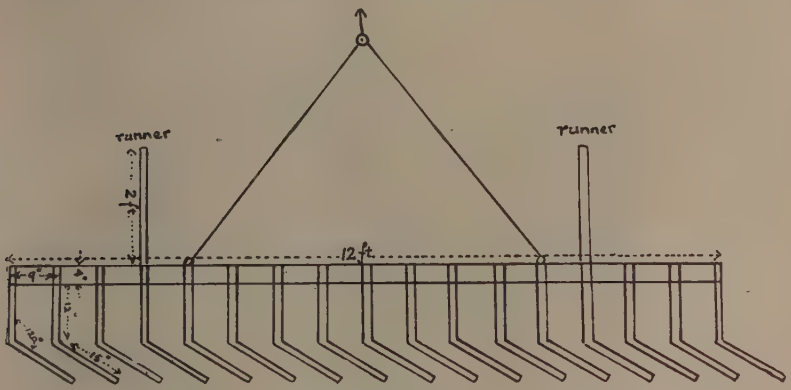

Fig. 2.—Illustration of general scheme used in the California scraper. Scale ½in. = 1 foot.

be seen on some holdings, and this curse of the Eastern States of Australia should be summarily dealt with.

The Eastern States farmer uses a "scraper" for this purpose, and I am taking the liberty of suggesting an implement which may be of use in Western Australia for dealing with the weeds mentioned, and perhaps in other States.

A brief description of the California implement is as follows:—

A 2-inch by 4-inch pole about 12 feet long is taken and marked off at suitable points, say about 9 inches apart. At these points are bolted steel tynes, shaped as in the diagram, Fig. 1. These tynes should be about 2¼ feet long, 1¾ to 2 inches wide, and ¼ to ⅜ inch thick. They are bent in the middle to an angle of 120 degrees and the front or cutting edge sharpened to decrease the draft. The cutting knife should be inclined downwards at about the angle of a ploughshare to cause it to draw itself slightly into the ground. The exact shape of the tynes for most efficient working will have to be determined by experiment, as the author was not able to get any measurements from the implement in the field. A couple of runners placed in front of the crossbar may improve the working of the implement and, if adjustable, enable the driver to regulate the depth of the scraper. The diagram in Fig. 2 will give some idea of the general nature of the scheme.

According to the efficient manner in which the scraper worked in a Californian orchard, it should be very useful in the treatment of summer weeds on fallow. It has the advantages of—

1. Being cheap;
2. Being light in draft;
3. Being made on the farm;
4. Skimming just under the surface without damaging the mulch or bringing up moist soil from below;

5. Not dragging weeds;
6. Being made any size desired.

Certain elaborations occurred to the author after some consideration of its use in Western Australia:—

(a) Equipment with three small wheels; two on the crossbar; one in front like a spring-tooth cultivator. The height of the crossbar, above the ground, could be adjusted by means of a crank axle. The depth of cut of the tynes could be regulated by means of the front wheel instead of runners as mentioned above.

(b) To cope with stones and stumps which are still numerous on many places the tynes could be hinged on the crossbar and held in position by means of a spring of proper strength. This idea is illustrated in Fig. 3.

(c) Where the ground is uneven, for instance due to the presence of crab holes. The implement could be easily made in sections of convenient size and a reasonable number of sections used as a unit.

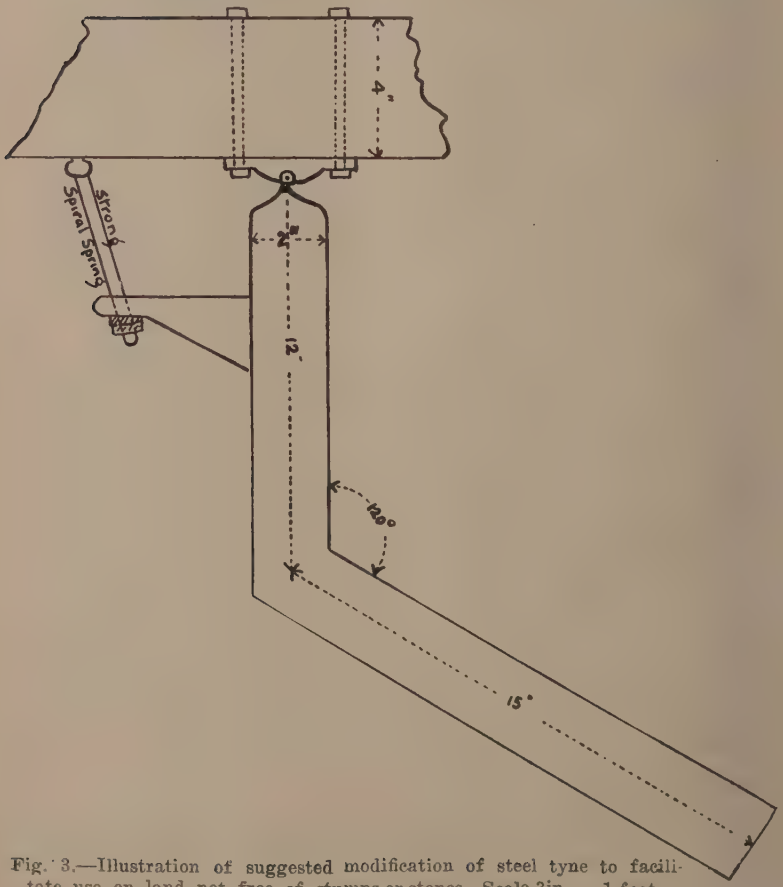

Fig. 3.—Illustration of suggested modification of steel tyne to facilitate use on land not free of stumps or stones. Scale 3in. = 1 foot.

HAND FEEDING OF SHEEP.

By Hugh McCallum,
Sheep and Wool Inspector.

It is important when a dry spell occurs not to wait until the sheep have lost in condition and strength before beginning to hand feed. The weakness of a sheep that has been starved is reflected in all the internal organs, and such an animal is unable to assimilate the nourishment in the food that it ingests. It can easily be understood that there is more chance of keeping up the condition of a healthy sheep than of one with a constitution already weakened by lack of nourishment. Should hand-feeding be necessary it should be commenced whilst there is yet natural feed. One of the main factors of successful sheep raising is the feeding of the flock. "Feeding is half the breeding"—this applies more particularly to the unborn and the immature young. The good condition of the ewe when carrying and suckling the lamb is an important factor in the successful rearing of the offspring.

In hand feeding no one food is sufficient to keep up the animal's strength —a balanced ration is necessary. The feeding of grain alone, without the addition of some roughage, will be attended with disaster. On a farm this should be possible as every farmer should have on hand reserves—hay, straw, etc.—and these are of inestimable value in a dry season. Good licks are necessary for sheep in the dry season; they cost little and are of great benefit. A little food given daily will produce better results than larger amounts at irregular intervals.

Lambing ewes should be fed—if it is necessary to feed—*during the whole period of gestation,* not just towards the end as is usually the case with many sheep owners, to ensure that their offspring are endowed with the best constitution possible and the fullest powers of production and reproduction. Too many lambs are lost through neglect in our State. This should not occur if more attention were given to detail. Every successful lambing is the means of building up our flocks, both in numbers and constitution, and of increasing our wool clip in weight and quality.

The weaker sheep should be fed away from the remainder of the flock; under ordinary conditions the stronger sheep get more feed than the weak. This is often the case when troughing is used. If the food is fed from the ground it should be scattered in such a way as to give all the sheep an equal chance at feeding time, as in many instances the poorer sheep are robbed of their ration.

Lambing ewes, as they drop their lambs, should be placed in a separate paddock where they will not be hindered by the lambs from obtaining their food. If this is not done the ewes either lose their ration or forsake their lambs in order to get their food. Many of the pastures upon which ewes in lamb and rearing lambs have to exist are utterly inadequate for a successful

lambing—they are what is known as "sheep sick." If changed from paddock to paddock the sheep will do better than on one pasture all the time. It is imperative that, if the breeding ewes are to produce and rear healthy lambs and produce a good clip of wool, they should be well fed.

After the first rains have fallen and the green feed begins to shoot, hand feeding should not be discontinued immediately, as the grass and herbage does not contain very much nutriment. Very often big losses occur after the change of weather through the discontinuance of hand feeding. This should be gradually reduced as the natural feed increases in feeding content.

Many sheep farmers to-day have no reserves of feed. This should not be considering the good seasons we have enjoyed. The growing of fodders would enable the land to carry more sheep and also add value to it. On no account should pastures be over-stocked as they will then be eaten right out and have to be re-established.

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1—4

BEEKEEPING NOTES.

H. WILLOUGHBY LANCE,
Apiculturist.

During my summer tour of inspection, I have noticed that many small beekeepers make the mistake of having a large number of weak or medium hives, instead of a few good strong ones, and count their wealth by the number of swarms they catch each spring rather than by the honey produced.

The experienced beekeeper of to-day aims at having a few strong colonies in good frame hives instead of many weak ones in half rotten boxes or even in frame hives.

The work entailed in manipulating six strong frame hives is much less than that of twelve weak ones, and the honey yield is usually as great, in the case of frame hives, and 100 per cent. more than box hives. Then again the losses due to the moth pest are negligible with strong hives and good queens. If a beekeeper is in the habit of keeping his hives strong, he will the sooner detect foul brood without losing his bees. If foul brood gets into weak hives, it will wipe these out very quickly, but if into strong ones, the watchful beekeeper will notice the weakening of his hives in time to save them before they have dwindled into a handful of bees.

In many cases the strain of bees kept is very poor, being either black bees or hybrids. Some hybrids are good honey gatherers, especially the first cross, but in most cases the Italians are much better workers and resist disease better.

In Apiaries with both Italian and hybrid bees, the heavy hives are usually Italian, and in no case where I have found foul brood, have the bees been pure Italian.

In one case where moth had cleaned out a hive of cross-bred bees, a swarm of fairly good Italians took possession of the hive and cleaned out the moth, building their new comb on to the old black comb that had been partially destroyed by the moth.

Also the Italians are usually quiet bees, easy to handle, clinging to the combs after a little puff of smoke, instead of rushing about on the top of the frames and over the sides of the hive, generally making it uncomfortable for the beekeeper in more ways than one.

Beekeepers, generally, would find that it would pay them well to give more attention to the breeding and selection of their queens from their best hives, or by purchasing from a reliable breeder.

Foul brood.—With regard to foul brood, I have found several isolated cases, where least expected. In all cases but one it has been in towns. In that one exception the bees had been brought from a town to the country some time previously.

These facts considerably strengthen the argument that the disease is brought into the State in imported honey. Empty containers being thrown out by grocers and others, in towns, and these are naturally cleaned up by bees when there is not much nectar to be gathered from flowers.

Beekeepers will be glad to know that in some nine cases found last October, the methods adopted have apparently been successful, and the Apiaries appear to be free from disease. We cannot, however, be certain of the cure yet, as spores may have been lying dormant in some hive, and break out later, or it may be carried to another Apiary and not be discovered yet.

All beekeepers, especially those in the vicinity of towns, should watch their brood carefully and send a sample of any brood of abnormal appearance to the Agricultural Department for examination.

Transferring bees to new hives.—I frequently receive inquiries regarding the transference of bees from old hives (or boxes from which the combs cannot be removed) into Standard Frame Hives. The following particulars may be of assistance to any such inquirers.

1. Prepare the new hive with foundation wired into the frames (full sheets by preference), with a queen excluder on top under the cover.

2. Remove the old hive, and place in front of the original location.

3. Place new hive in old position on a stand or box, so that the bottom of the new hive is a few inches higher, and projecting over the top of the old hive which is now in front.

4. Slide the body of the new hive forward, so that it projects about two inches beyond the floor board, close the gap thus made at the back by a piece of wood or rag.

5. Remove the top of the old hive, if removable, but if a box, turn the box upside down and raise the back with a block of wood or brick, the back edge resting against the front edge of floor board of new hive, so that the bees can crawl from the old hive to the new hive.

6. Now drum the sides of the old hive vigorously. After a little while the bees will be noticed crawling up the back of the old hive and into the new one. They may be hurried up by an occasional puff of smoke at the front and lower end of the old hive. Watch carefully to see the queen pass up. She will probably not go up until the majority of the bees have gone.

7. When the queen is in the new hive, slide the new hive back into the old position. Remove the cover and place the old hive on top of the queen excluder.

The queen being below, no further eggs will be laid in the old hive, and in a month's time all the brood will be hatched, and the old hive can be removed.

An alternative method to placing the old hive on top of the new one, is to cut out the old comb, tie any good slabs of brood into empty frames, with binder twine or tape, and place these in the centre of the new hive. This method is adopted by many beekeepers, but it is rather a messy job, and means the loss of a small amount of brood. The first method is the simplest for beginners.

FIELD EXPERIMENTS WITH WHEAT,

AVONDALE STATE FARM.

A. S. WILD, Agricultural Adviser.

J. BAILEY, Farm Manager.

The field experiments conducted at this farm were the Rates of Seeding, Rates of Superphosphate, Basic Slag and Superphosphate Experiments.

The plots were each one-eighth of an acre in area. Each experiment was planted in sections, each section being repeated five times.

The soil on which the experiments were conducted is typical undulating York and Jam timber country and has been cleared a number of years.

The land for this year's experiment was ploughed 4 to 5 inches deep with a mouldboard plough early in August. Late in September it was cultivated with a springtyne cultivator, disc cultivated during March after rain, and springtyne cultivated on the 6th and again on the 19th May.

The plots were free from weeds and in good condition when planted.

The monthly rainfall as officially recorded during 1927 at Beverley, four miles distant, together with the average for the past 42 years, is hereunder:—

	Jan.	Feb.	Mar.	Aprl.	Growing Period. May.	Ju.	July.	Aug.	Sept.	Oct.	Total.	Nov.	Dec.	Total for Year.
1927	9	21	337	50	103	303	319	167	189	126	1,207	31	7	1,662
Average, 42 yrs.	30	40	64	88	220	321	324	246	170	100	1,381	47	40	1,690

The rainfall during the growing period was 174 points below the average. This was mainly accounted for in May, when the registration was 117 points and in August 79 points below the average. This caused a check in the growth of crops during the later part of August and early September, but the yields were not affected.

Rates of Seeding Experiment.

The midseason variety Nabawa was planted in this experiment. Superphosphate was applied at 100lbs. per acre.

The results obtained this year, together with the average for the two years the experiment has been conducted, are set out hereunder:—

AVONDALE STATE FARM—RATE OF SEEDING EXPERIMENT.
GRAIN YIELD.

Variety: Nabawa. Rate of Super. 100lbs. per acre. Planted 10th May, 1927.

Rate of Seed per Acre.	Computed Yield per Acre. Sec. 1.	Sec. 2.	Sec. 3.	Sec. 4.	Sec. 5.	Average Yield per acre.	Percentage. 1927.	Percentage. 1926-27
	bus. lbs.	bus. lbs.	bus. lbs.	bus. lbs.	bus. lbs.	bus. lbs.	%	%
90lbs.... ...	15 27	16 30	15 54	16 30	15 0	15 52	110	108
45lbs. (Control)	16 3	15 18	13 48	13 12	13 48	14 26	100	100
60lbs.... ...	16 48	16 3	14 24	14 6	13 30	15 10	105	105

The results, which are for two years only, indicate that a slightly better return may be expected when the heavier rates of seed are sown in this district, which is favoured with good winter and spring rains.

Rates of Superphosphate Experiment.

The midseason variety Nabawa was also planted in this experiment and was sown at the rate of 45lbs. per acre.

The results obtained this year, together with the average results for the two years the experiment has been conducted, are set out hereunder:—

RATE OF SUPERPHOSPHATE EXPERIMENT.

Variety: Nabawa. **Seed** 45lbs. per acre. **Planted** 10th May, 1927.

Rate of Super. per Acre.	Computed Yield per Acre.					Average Yield per Acre.	Percentage Yield 1927.	Percentage Yield 1926-27.
	Sec. 1.	Sec. 2.	Sec. 3.	Sec 4.	Sec. 5.			
	bus. lbs.	bus. lbs.	bus lbs.	bus. lbs.	bus. lbs.	bus. lbs.	%	%
225lbs. ...	14 51	17 15	16 30	15 27	21 18	17 4	113	108
75lbs. (Control)	10 48	16 3	13 39	15 27	19 39	15 7	100	100
150lbs. ...	13 30	18 0	15 0	17 42	23 51	17 36	116	108

The results from both the heavier rates of application are almost equal and indicate that better returns are obtained when superphosphate is applied up to 150lbs. per acre.

Basic Slag and Superphosphate Experiment.

As in previous years this experiment was carried out with 22 per cent. superphosphate and 17 per cent. basic slag (Thomas Phosphate).

It was designed to ascertain the advantage, if any, obtained when phosphoric acid was applied to the soil in basic slag, as compared with phosphoric acid when applied in superphosphate.

The plots were arranged so that both the amount (by weight) and the quality (percentage of phosphoric acid) of the fertiliser applied per acre were compared with 22 per cent. superphosphate, the principal fertiliser used by wheat farmers.

To meet these requirements three plots were planted, viz.:—

1.—75lbs. per acre of 17 per cent. basic slag (equal by weight to control).

2.—75lbs. per acre of 22 per cent. superphosphate (control).

3.—97lbs. per acre of 17 per cent. basic slag (supplying the same amount of phosphoric acid as 75lbs. of superphosphate).

The area of each plot was one-eighth of an acre, and each section was repeated five times.

There was a marked difference between the plots throughout the growing period, these differences being indicated in the subsequent grain yields which, together with the averaged results for the past two years, are set out in the table hereunder:—

BASIC SLAG AND SUPERPHOSPHATE EXPERIMENT.

GRAIN YIELDS.

Variety: Nabawa. Rate of Seed, 45lbs. per acre. Planted 10th May, 1927.

Rate of Fertiliser per Acre.	Relative quantities Phosphoric acid per Acre.	Computed Yields per Acre.					Average Yield per Acre.	Percentage Yield 1927.	Percentage Yield 1926-7.
		Sec. 1.	Sec. 2.	Sec. 3.	Sec. 4.	Sec. 5.			
		bus. lb.	bus. lb.	bus. lb.	bus. lb.	bus. lb.	bus. lb.	%	%
97lbs. 17 % Basic Slag	100	18 0	15 54	16 30	18 9	20 6	17 44	75	84
75lbs., 22 % Superphosphate (Control)	100	24 36	22 30	22 57	24 45	23 15	23 37	100	100
75lbs., 17 % Basic Slag	77	15 18	16 39	17 51	18 45	14 15	16 34	7	

Although there is not a great difference in the results obtained from the plots receiving the two different rates of basic slag, there is, however, a considerable difference between these and the control plot of 75lbs. of superphosphate, and it can be concluded from these results that the wheat plants' requirement of phosphoric acid is best supplied by superphosphate.

FIELD EXPERIMENTS WITH WHEAT AND OATS AT THE MERREDIN EXPERIMENT FARM.

I. THOMAS, Superintendent of Wheat Farms.

J. H. LANGFIELD, Farm Manager.

The rainfall recorded at the farm during the year, together with the average for the past 16 years, is set out hereunder:—

Year.	Jan.	Feb.	Mch.	Apl.	Growing Period.						Total.	Nov.	Dec.	Total for year.
					May.	June.	July.	Aug.	Sept.	Oct.				
1927 ...	9	2	565	36	53	164	132	89	167	64	669	19	61	1,361
Average, 16 yrs.	59	53	85	78	128	174	189	138	92	81	802	37	59	1,17

The excessive rain during March caused the fallowed land to set down, and difficulty was experienced in obtaining a good even seed bed. Following on these rains the rainfall during the growing period (May-October), although light, was regular and sufficient until the end of August when a dry spell occurred.

The climatic conditions which prevailed during the winter months were ideal for the growth of the crops. Clear, frosty nights were experienced, the effect of which was to retard rank flaggy growth and encourage the plants to stool out better.

Fortunately, the dry spell at the end of August was of short duration and was followed by good rains during September and useful rains in October, with the results that excellent yields were obtained.

All experiments were planted on fallow except the fertiliser experiment, some of the plots of which, owing to its nature, were planted on unfallowed land.

The land was of typical Salmon and Gimlet forest country and had been cleared some years previously.

The system of cropping is a threesome—fallow, crop, stubble.

RATE OF SUPERPHOSPHATE EXPERIMENT.

The plots for this experiment, which is now of five years duration, were ploughed with a heavy disc plough in June, 1926, to a depth of four inches and cultivated with a springtyne implement in September. It was left in this state until March, when it was again cultivated with the springtyne.

A disc cultivation early in April, a springtyne cultivation at the end of the same month, and also twice prior to seeding, completed the soil working operations.

As in previous years the variety sown was Gluyas Early, the rate being 45 lbs. of seed per acre. Seeding took place on May 20th, 1927.

Owing to the cold weather and the shortage of surface moisture, germination was slow. A good fall of rain on June 4th, however, ensured a good, even germination. The seed was treated with carbonate of copper as a preventative against bunt.

As in previous years, the plots receiving the heavier dressings of superphosphate were more dense and vigorous than those receiving lesser amounts.

The results of these experiments, together with the percentage results for the past five years, are given hereunder:—

RATE OF SUPERPHOSPHATE EXPERIMENT.

GRAIN RESULTS.

Variety, "Gluyas Early." *Planted May 20th, 1927.* *Seed, 45lbs. per acre.*

Rate of Superphosphate per acre.	Computed Yield per Acre.										Average Yield, 1927.		Percentage Yields, 1927.	Percentage Yields, 1923-27.
	Section 1.		Section 2.		Section 3.		Section 4.		Section 5.					
	bus.	lbs.	bus.	lbs.	bus.	lbs.	bus.	lbs.	bus	lbs.	bus.	lbs.	%	%
150 lbs.... ...	32	16	32	0	30	24	33	4	32	40	32	5	107	110
75 lbs.... ...	30	8	29	28	29	28	30	8	30	56	30	1	100	100
225 lbs.... ...	34	0	32	24	34	16	35	20	35	4	34	13	114	116

HAY RESULTS.

Rate of Superphosphate per acre.	Computed Yield per Acre: Section 1.	Section 2.	Section 3.	Average Yields, 1927.	Percentage Yields, 1927.	Percentage Yields, 1923–27.
	cwt. qrs. lbs.	cwts. qrs. lbs.	cwt. qrs. lbs.	cwt. qrs. lbs.	%	%
150 lbs.	47 3 20	52 3 20	54 1 4	51 2 24	105	112
75 lbs.	46 2 16	49 0 16	52 1 12	49 1 15	100	100
225 lbs.	57 0 8	58 2 16	58 1 4	58 0 0	117	119

It will be noticed from the above tabulations that the percentage results of both hay and grain are almost identical, and as these results have been obtained over a period of five years, it can be concluded that increased yields are obtained when the heavier dressings of superphosphate are applied.

RATE OF SEEDING EXPERIMENT.

As in previous years, this experiment was carried out with two varieties, viz., a free stooling one, "Nabawa," and a sparse stooler, "Florence."

The land for this trial was ploughed in June, 1926, to a depth of four inches, cultivated with a springtyne cultivator in September and again after the first rains in March. A disc cultivation in early April and a springtyne cultivation prior to planting completed the soil preparation.

The seed was sown at the rates of 30, 45 and 60 lbs. per acre. In the midseason variety section, sown on April 14th, the immediate germination was patchy, but after a fall of 38 points on May 8th a good general germination resulted.

The early variety section gave a slow but even germination, the cold weather and light rainfall impeding the primary growth.

RATE OF SEEDING EXPERIMENT.

Variety, "Nabawa." Planted 14th April. Superphosphate, 100lbs. per acre.

Rate of Seed.	Computed Yield per Acre. Section 1.	Section 2.	Section 3.	Section 4.	Section 5.	Average Yield, 1927.	Percentage Yields, 1927.	Percentage Yields, 13 years.
	bus lbs.	bus lbs.	bus. lbs.	bus. lbs.	bus. lbs.	bus. lbs.	%	%
30lbs. per acre ...	28 0	30 0	29 52	33 20	29 52	30 13	92	95
45lbs. per acre ...	31 20	33 12	33 4	34 16	32 16	32 40	100	100
60lbs. per acre ...	34 8	32 32	31 44	33 36	32 32	32 55	100	100

Variety, "Florence." Planted 21st May. Superphosphate, 100lbs. per acre.

Rate of Seed.	Computed Yield per Acre. Section 1.	Section 2.	Section 3.	Section 4.	Section 5.	Average Yield, 1927.	Percentage Yield, 1927.	Percentage Yield, 13 years.
	bus. lbs.	bus. lbs.	bus. lbs.	bus. lbs.	bus. lbs.	bus. lbs.	%	%
30lbs. per acre ...	26 40	27 12	26 48	26 56	28 8	27 9	96	96
45lbs. per acre ...	28 56	27 36	27 12	28 32	29 4	28 16	100	100
60lbs. per acre ...	27 36	27 12	28 16	28 8	28 16	27 53	99	96

From the summarised results it is quite apparent that it is unnecessary to sow at a greater rate than 45 lbs. per acre of graded seed for either hay or grain.

FERTILISER EXPERIMENT.

This experiment, which is also being carried out at the Chapman Experiment farm, is conducted for the purposes of ascertaining:—

(1) Whether a small quantity of nitrogenous fertiliser, 25 lbs. per acre of sulphate of ammonia, applied at planting time, has a beneficial effect upon the yields of wheat crops; and

(2) Whether the same quantity of nitrogenous fertiliser will lessen the need for fallowing.

For the purpose of the trial three plots were fallowed in July (1926) and two plots situated between them were left unfallowed. The fallowed plots were ploughed with a heavy disc implement 4in. deep and were cultivated with a springtyne cultivator in September.

The unfallowed plots were ploughed early in April after 565 points of rain falling in March. After this date all the plots received the same cultivation, being once disc cultivated, followed by a cultivation with the springtyne machine prior to seeding.

The germination was slow, owing to lack of surface moisture, but a good even germination followed the 38 points of rain which fell on 8th of May.

The results obtained this year, together with the percentage results for the past three years, are given hereunder:—

FERTILISER EXPERIMENT.

Variety, "Nabawa." Planted, 5th May, 1927. Superphosphate, 112lbs. per acre.

Treatment.	FALLOWED. Computed Yield per acre. Section 1.		Section 2.		Section 3.		Average Yields, 1927.		Percentage Yields, 1927.	Percentage Yields, 1925-27.
	bus.	lbs.	bus.	lbs.	bus.	lbs.	bus.	lbs.	%	%
112lbs. Super	26	8	30	56	31	4	29	23	100	100
112lbs. Super : 25lbs. Sulph. of Ammonia	25	36	28	48	24	48	26	24	90	97

Treatment.	UNFALLOWED. Computed Yield per acre. Section 1.		Section 2.		Average Yield, 1927.		Percentage Yields, 1927.	Percentage Yields, 1925-27.	Percentage Comparisons Fallowed.	Unfallowed.
	bus.	lbs.	bus.	lbs.	bus.	lbs.	%	%	%	%
112lbs. Super... ...	25	12	25	36	25	24	100	100	100	86
112lbs. Super ; 25lbs. Sulph. of Ammonia	23	44	24	32	24	8	95	95	100	91

From the above results it can be concluded that on forest land the application of a small amount of sulphate of ammonia at the time of seeding does not increase the yields, and also that it does not reduce the need for fallowing, but rather does it emphasise the necessity for it to increase the yields.

Fallowing is not only responsible for the conservation of moisture, but on well worked fallow the process of nitrification is also stimulated during the spring and summer months, and sufficient nitrate is made available in the soil for the use of the succeeding crops.

TIME OF SEEDING EXPERIMENT.

This experiment has been conducted for the past five years in order to determine the most suitable month for seeding the wheat crop.

The land was ploughed in June, 1926, 4in. deep with a heavy disc implement and was springtyne cultivated in September. The land lay thus till April, when it was disced and afterwards springtyne cultivated, the May plots being again springtyned before seeding, as were the June and July plots also. The latter were harrowed after drilling.

The tabulated results below show last year's results, together with the averages from 1923-27:—

TIME OF SEEDING EXPERIMENT.

Variety, "Gluyas Early." *Seed, 45lbs. per acre.* *Superphosphate, 112lbs. per acre.*

Date of Planting.	Computed Yield per Acre.										Average Yield per acre, 1927.		Percentage Yield, 1927.	Average Yield		Percentage Yield.
	Section 1.		Section 2.		Section 3.		Section 4.		Section 5.							
	bus.	lbs.	bus.	lbs.	bus.	lbs.	bs.	bus.	bus.	lbs.	bus.	lbs.	%	bus.	lbs.	%
May 18th	33	4	32	56	32	0	33	20	30	56	32	27	100	27	36	100
June 15th	26	0	28	32	27	12	27	4	26	0	27	5	83	23	31	85
July 15th	12	2	12	48	12	48	11	14	11	12	12	7	37	13	57	51

There is only one conclusion that can be drawn from the above results of the experiment which has been conducted for the past five seasons, and that is the seeding should be completed during the month of May. This is the practice generally adopted and can be continued with every confidence.

OAT VARIETY TRIAL.

This experiment has been conducted during the past five years. This year four varieties were used, with "Burt's Early" as a control.

The land, which was typical gimlet and salmon country, was ploughed in June, 1926, to a depth of 4in., cultivated in September with a springtyne cultivator, again cultivated with the same implement after the March rain, disc cultivated in early April and again cultivated with a springtyne machine before planting.

The results obtained this year, together with previous years' percentage averages, are as follow:—

OAT VARIETY TRIAL.

GRAIN RESULTS.

Seed, 37lbs. per acre. *Superphosphate, 100lbs. per acre.*

Variety.	Computed Yield per Acre.										Average.		Percentage Yield, 1927.	Average Yield, 1923-27.
	Section 1.		Section 2.		Section 3.		Section 4.		Section 5.					
	bus.	lbs.	bus.	lbs.	bus.	lbs.	bus.	lbs.	bus.	lbs.	bus.	lbs.	%	%
Burt's Early (Control)	38	8	37	24	38	0	40	8	38	24	38	21	100	100
Mulga	49	32	48	8	49	32	49	0	45	16	48	17	126	130
Algerian ...	37	16	34	24	35	8	27	0	25	32	32	0	83	104
Guyra	36	24	44	24	46	16	43	24	41	24	42	22	111	112
Glen Innes No. 7	37	16	46	0	51	0	44	8	42	0	44	5	116	110*
Burt's Early (Control)	37	32	35	8	39	16	38	8	38	32	37	35	100	100

* Average for 3 years.

HAY RESULTS.

Variety.	Computed Yield per Acre.									Average Yield, 1927.			Percentage Yield, 1927.	Percentage Yield, 1923-27.
	Section 1.			Section 2.			Section 3.							
	cwt.	qrs.	lbs.	cwt.	qrs.	lbs.	cwt.	qrs.	lbs.	cwt.	qrs.	lbs.	%	%
Burt's Early (Control)	47	2	8	55	0	16	52	0	16	51	2	13	100	100
Mulga	47	3	20	49	3	12	53	1	4	49	2	21	96	111
Algerian	45	2	8	45	0	16	46	2	24	45	3	7	89	95
Guyra	47	1	20	49	3	4	49	3	4	49	0	0	97	107
Glen Innes No. 7 ...	46	0	24	47	3	12	45	2	24	46	2	11	92	104*
Burt's Early (Control) ...	50	0	0	51	2	0	47	3	20	49	3	7	100	100

* Average for 3 years.

In the plots harvested for hay this year, excellent yields were obtained from all varieties. The control plot of "Burt's Early" giving the highest returns was closely followed by the early variety "Mulga" and the midseason variety "Guyra." The early variety "Glen Innes No. 7" was a little better than the late variety "Algerian." However, the average percentage results for the experiment since its commencement in 1923 confirms the conclusion already drawn that for districts with a rainfall similar to that experienced at Merredin the early and midseason varieties are the most suitable for hay purposes.

The yields obtained from the grain section of the experiment were also high, and with the exception of the late maturing variety, "Algerian," which was considerably below that of the control, the yields obtained from the other varieties were considerably above. The average percentage results support this with the exception of Algerian, which in these results shows slightly better than the control, but in view of the comparatively low yields this year it can be concluded that the midseason and early varieties are also the most suitable to plant for grain purposes.

FIELD EXPERIMENTS WITH WHEAT.

CHAPMAN EXPERIMENTAL FARM.

I. THOMAS, Supt. of Wheat Farms.
P. JEFFREY, Farm Manager.

The land on which the experiments were conducted originally carried jam timber, and had been cleared some years previously.

The following table shows the monthly rainfall recorded at the farm during the year, together with the averages for the past 22 years:—

—	Jan.	Feb.	Mch.	Apl.	Growing Period.						Total.	Nov.	Dec.	Total for Year.
					May.	June.	July.	Aug.	Sept.	Oct.				
1927 ...	4	10	524	35	261	532	390	277	221	85	1,766	8	94	2,441
Previous 22 years av'ge	28	52	49	44	226	428	394	264	170	98	1,580	27	26	1,806

These records show the total rainfall for the year to be 635 points above the average, whilst that for the growing period was 186 in excess of the average. This excess was not beneficial, but rather the reverse, as some of the land became waterlogged early in the season, which was not favourable for the growth of the crops.

All the experiments were planted on fallowed land. The initial ploughing was done during the winter months the previous year, when the land was in excellent condition for this operation, which was followed by cultivation with either a springtyne or disc cultivator to destroy weeds and maintain a mulch to assist moisture conservation.

After the heavy rainfall in March the weed seeds germinated readily, when it was found necessary to use the disc cultivation implement to deal with the subsequent growth. This was followed by a springtyne cultivation prior to planting.

Rate of Superphosphate Experiment.

This experiment was commenced in 1923. For last year's experiment the plots were ploughed in June with a 4-furrow mouldboard plough, cultivated with a disc implement about the middle of September, and again with a springtyne machine about the end of the same month. During April of the present year it was disc-cultivated, and, owing to weed growth, it was found necessary to repeat the operation in May. It was springtyne cultivated prior to seeding on May 18th. The seed bed was in excellent condition.

The following tables show the results of the experiments, together with averages for the total period for which the experiment has been conducted.

RATE OF SUPER EXPERIMENT.

GRAIN RESULTS.

Variety, "Nabawa." *45lbs. seed per acre.* *Planted 18th May, 1927.*

Rate of superphosphate applied per acre.	Computed Yield per acre.										Average yield per acre, 1927.		Percentage Yield, 1927.	Percentage Yield, 1923-27.*
	Section 1.		Section 2.		Section 3.		Section 4.		Section 5.					
	bus.	lbs.	bus.	lbs.	bus.	lbs.	bus.	lbs.	bus.	lbs.	bus.	lbs.	%	%
150 lbs.... ...	19	28	19	52	19	12	19	52	18	24	19	22	103	103
75 lbs.... ...	18	48	19	12	19	12	19	36	17	4	18	46	100	100
225 lbs.... ...	19	52	20	56	20	8	20	16	19	36	20	10	107	114

* 1926 results not taken.

HAY RESULTS.

Rate of superphosphate applied per acre.	Computed Yield per acre.									Average yield per acre, 1927.			Percentage Yield, 1927.	Percentage Yield, 1923-27.*
	Section 1.			Section 2.			Section 3.							
	cwt.	qrs.	lbs.	cwt.	qrs.	lbs.	cwt.	qrs.	lbs.	cwt.	qrs.	lbs.		
150 lbs.	24	3	15	26	2	1	26	3	2	26	0	6	108	112
75 lbs.	24	2	14	23	2	1	24	0	26	24	0	14	100	100
225 lbs.	28	1	7	26	1	10	29	1	7	27	3	17	116	114

* 1926 results not taken.

As with a similar experiment at the Merredin Experiment Farm, it is again indicated that the use of higher amounts of superphosphate results in increased yields for both hay and grain.

Rate of Seeding Experiment.

This experiment is planted in two sections, the differentiation being the stooling properties of the two varieties of wheat planted. Yandilla King was selected for the free stooling variety, while the sparse stoolers were represented by S.H.J.

The land for both sections was similarly worked. It was ploughed in July, 1926, with a mouldboard plough and was springtyne cultivated in September.

In March it was disc cultivated and again in May to kill early weeds germinated by the March rain; the harrow preceded the drill.

The plots planted with the variety Yandilla King were affected by stem rust in the spring, the grain of which was pinched and shrivelled, which accounts for the low yields obtained.

The following tables give the yields of the two sections:—

RATE OF SEEDING EXPERIMENT.

GRAIN YIELDS.

Variety, "S.H.J." *Planted 24th May,* 1927. *Superphosphate, 150lbs. per acre.*

Rate of seed per acre.	Computed Yield per acre.					Average yield per acre. 1927.	Percentage Yields 1927.	Average yield per acre, 1923-27.	Average percentage Yield, 1923-27.
	Section 1.	Section 2.	Section 3.	Section 4.	Section 5.				
	bus. lbs.	bus. lbs.	bus. lbs.	bus. lbs.	bus. lbs.	bus. lbs.	%	bus. lbs.	%
60 ...	13 4	12 40	11 44	12 24	12 24	12 27	107	16 32	106
45 ...	12 24	11 28	11 4	10 56	12 16	11 37	100	15 37	100
90 ...	13 12	12 0	11 52	11 44	12 16	12 13	105	17 25	111

HAY YIELDS.

Rate of seed per acre.	Computed Yield per acre.			Average yield per acre, 1927.	Percentage Yields, 1927.	Average yield per acre. 1923-27.	Average percentage Yield, 1923-27.
	Section 1.	Section 2.	Section 3.				
	cwt. qrs. lbs.	cwt. qrs. lbs.	cwt. qrs. lbs.	cwt. qrs. lbs.	%	cwt. qrs. lbs.	%
60	16 3 12	17 0 0	19 0 16	17 2 19	117	27 1 5	105
45	14 2 16	14 3 12	15 3 12	15 0 13	100	25 3 19	100
90	16 2 8	17 1 12	17 0 0	16 3 25	112	28 1 2	108

GRAIN YIELDS.

Variety, "Yandilla King." *Planted 30th April,* 1927. *Superphosphate, 150lbs. per acre.*

Rate of seed per acre.	Computed Yield per acre.					Average yield per acre, 1927.	Percentage Yield, 1927.	Average yield per acre, 1923-27.	Average per centage Yield, 1923-27.
	Section 1.	Section 2.	Section 3.	Section 4.	Section 5.				
	bus. lbs.	bus. lbs.	bus. lbs.	bus. lbs.	bus. lbs.	bus. lbs.	%	bus. lbs.	%
60 ...	6 8	5 44	5 28	5 28	6 8	5 47	109	18 57	97
45 ...	4 56	5 12	4 56	5 36	5 52	5 18	100	19 36	100
90 ...	5 44	5 28	5 28	6 16	6 16	5 50	110	19 44	101

HAY YIELDS.

Rate of seed per acre.	Computed Yields per Acre.			Average yield per acre, 1927.	Percentage Yields, 1927.	Average yield per acre, 1923–27.	Average percentage Yields, 1923–27.
	Section 1.	Section 2.	Section 3.				
	cwt. qrs. lbs.	cwt. qrs. lbs.	cwt. qrs. lbs.	cwt. qrs. lbs.	%	cwt. qrs. lbs.	%
60	10 1 4	9 2 24	10 2 16	10 0 24	101	24 1 14	92
45	8 2 24	11 0 16	10 2 8	10 0 16	100	26 1 21	100
90	9 2 24	11 3 20	8 2 24	10 0 13	100	26 0 14	99

The results of this experiment in previous years have indicated that with a sparse stooling variety, the yields for both hay and grain are increased when the heavier rates of seed are sown. This is supported by the results obtained this year, particularly on the plots harvested for hay.

With the free stooling variety the grain yields obtained this year from the plots planted with the heavier rates of seed are better than the control plot planted with 45lbs. This is contrary to the results obtained in previous years, also the averaged yields obtained since the experiment was commenced in 1923. These averaged results indicate that with a free stooling variety there is no advantage in increasing the rate of seeding over 45lbs. per acre.

This is supported by the hay yields obtained this year, and also in the average results during the period the experiment has been conducted, viz., 1923-27.

Time of Seeding Experiment.

This experiment was commenced in 1923 and has been planted each year since, but owing to the plots being destroyed by fire in 1924 and other factors interfering with the results in 1925 and 1926, the results have not been obtained.

The land was ploughed with a four-furrow mouldboard plough in July, 1926, and springtyne cultivated late in September. It was again cultivated in October with a disc implement to check weed growth. In March the plots were springtyne cultivated, and, prior to seeding, all sections were disc cultivated and harrowed.

At the time of planting, the whole area was free of weed growth and a good seed bed obtained.

The June and July sections were each again springtyned prior to planting.

The following gives the results obtained:—

TIME OF SEEDING EXPERIMENT.

GRAIN RESULTS.

Variety, "Gluyas Early." Seed, 45lbs. per acre. Superphosphate, 100lbs. per acre.

Planted.	Computed Yield per Acre.			Average yield per acre, 1927.	Percentage yield, 1927.	Average yield, 1923-27.	Average percentage yield, 1923-27.
	Section 1.	Section 2.	Section 3.				
	bus. lbs.	bus. lbs.	bus. lbs.	bus. lbs.	%	bus. lbs.	%
June	14 48	13 28	13 52	14 3	83	15 51	81
May	16 48	17 20	16 32	16 53	100	19 32	100
July	9 20	8 40	9 4	9 1	57	11 48	60

The percentage results obtained from this experiment this year are very similar to those of 1926, and from them it is very evident that the yields of the wheat crop are decreased when planting is delayed until June.

These decreased yields from the June and July plots cannot be due to lack of moisture during any part of the growing period, but rather to an excess of rain during the early winter months. As this excess is typical for this period in this district, every endeavour should be made to complete the planting by the end of May.

The planting of a suitable variety in April is recommended rather than extending the planting into June. This will permit the young plants to develop a stand strong enough to better withstand the unfavourable water-logged condition of the soil during the early winter months.

Fertiliser Experiment.

The objects of this experiment are to determine:—

1. Whether a small quantity of nitrogenous feriliser, 25lbs. per acre, of sulphate of ammonia applied at planting time has a beneficial effect upon the yields of wheat crops; and
2. Whether the same quantity of nitrogenous fertiliser will lessen the need for fallowing.

For the purpose of the trial, three plots were fallowed in August the previous year (1926) and two plots situated between these were left unfallowed. The fallowed plots were ploughed with a four-furrow mouldboard plough, 4in. deep, and were cultivated with a springtyne cultivator early in September. It was again similarly treated at the end of March and at the time of seeding. The unfallowed land was ploughed with the four-furrow mouldboard plough on the 16th May and cultivated with the springtyne machine prior to planting on the 23rd May.

The tabulated results are given hereunder:—

FERTILISER EXPERIMENT.

Variety, "*Nabawa.*" *Planted* 23*rd May,* 1927. *Superphosphate,* 100*lbs. per acre.*

FALLOWED.

Treatment.	Computed Yield per Acre.						Average, 1927.		Percentage Yield.	
	Section 1.		Section 2.		Section 3.				1927.	1926–27.
	bus.	lbs.	bus.	lbs.	bus.	lbs.	bus.	lbs.	%	%
100lbs. Superphosphate	19	44	22	0	23	12	21	39	100	100
100lbs. Superphosphate; 25lbs. Sulph. of Ammonia	19	44	21	44	23	28	21	39	100	98

UNFALLOWED.

Treatment.	Computed Yield per Acre.				Average. 1927.		Percentage Yield.		Percentage Comparisons.	
	Section 1.		Section 2.				1927.	1926–27.	Fallowed.	Unfallowed.
	bus.	lbs.	bus.	lbs.	bus.	lbs.	%	%	%	%
100lbs. Superphosphate	15	28	18	24	16	56	100	100	100	75
100lbs. Superphosphate: 25lbs. Sulph. of Ammonia	18	20	17	52	18	6	107	100	100	77

The results above are for two years, and, as will be noticed, the average results obtained this year from the fallowed plots are remarkably even, whilst the percentage results for the two years are almost equal. This shows that the small application of 25lbs. of sulphate of ammonia at the time of planting has, up to the present, not increased the grain yields on the fallowed plots.

The average results from the unfallowed plots this year show that grain yields were increased by the addition of the 25lbs. of sulphate of ammonia, whilst the average percentage results for the two years are the same. No definite conclusion can be drawn, because yields of the plots receiving the sulphate of ammonia last year were nine per cent. below the yields obtained from the control plot.

However, the results of this experiment, as in the previous year, emphasise the importance of fallowing.

Fallowing is not only an aid to the conservation of moisture, but also during the spring and summer, on well cultivated land, the process of nitrification is stimulated and sufficient nitrates are made available for the use of the succeeding crop.

FIELD EXPERIMENTS WITH OATS AT WAGIN.

A. S. WILD, B.Sc. (Agric.), Agricultural Adviser.

Two experiments with oats were conducted on the property of Mr. G. Austin Piesse, Wagin. They were:—

1. Basic Slag and Superphosphate experiment.
2. An Oat Variety Trial.

The land on which these experiments were conducted was a light grey to red loam, running to a gravelly quartz at one end, the original timber being White Gum, Sheoak, and Jam.

The land had been ploughed to a depth of 4in. during the month of September, 1926. Prior to seeding during April, 1927, the land was cultivated with a springtyne cultivator.

The monthly rainfall, as officially recorded at Wagin during 1927, together with the average over 37 years, is shown hereunder:—

	Jan.	Feb.	Mch.	Apl.	Growing Period.							Nov.	Dec.	Total for year.
					May.	June.	July.	Aug.	Sept.	Oct.	Total.			
1927 ...	...	...	209	49	136	349	218	156	226	146	1,231	15	34	1,538
Average, 37 yrs.	28	63	113	96	208	297	297	241	191	129	1,363	48	41	1,752

The total rainfall for the year, 1,538 points, is 214 points below the average, and that for the growing period is 132 points below. Except for a short dry spell in August, the rainfall throughout the remainder of the growing period was regular and consistent.

Variety Trial with Oats.

The object of this experiment was to compare the yields of the different standard varieties of oats.

Four varieties were planted—

Algerian, the standard late variety.

Guyra, the standard midseason variety.

Burt's Early, the standard early variety.

Mulga, a promising new variety, which is a close rival of Burt's Early, as a general purpose variety.

All plots were planted in duplicate at the rate of 50 lbs. of seed per acre with 100lbs. of superphosphate on the 12th April. The area of each plot was ½ an acre.

The results obtained are set out in the table hereunder.

EXPERIMENTS AT WAGIN—OAT VARIETY TRIAL.

GRAIN YIELDS.

Rate of seed, 50lbs. per acre. Rate of super, 100lbs. per acre. Planted 12th April, 1927.

Variety.	Computed Yield per Acre.				Average Yield per Acre.	
	Section 1.		Section 2.			
	bus.	lbs.	bus.	lbs.	bus.	lbs.
Algerian	27	1	25	22	26	11
Guyra	30	24	30	24	30	24
*Mulga	14	34	14	39	14	36
Burt's Early	18	7	23	37	21	2

* Lodged before maturing.

The results are for one year only and no definite conclusion, therefore, can be drawn. They are, however, in favour of the midseason variety, Guyra, which appears to be suitable grain variety for this district.

The dry spell during August no doubt had some effect on the late Variety Algerian, and consequently affected the yield.

Unfortunately, the Mulga lodged before maturity, and as a result all the grain could not be harvested.

The experience in other districts with this variety indicated that it was stronger in the straw than most varieties and its lodging in this instance, therefore, was surprising.

All varieties had the appearance of yielding well if harvested for hay.

Basic Slag and Superphosphate Experiment.

Further to advice that Basic Slag was being applied to the cereal crops in preference to Superphosphate in the Wagin district, it was arranged to conduct an experiment and compare the results of the two fertilisers.

The midseason variety of oats, Guyra, was used and planted at the rate of 50lbs. of seed per acre. Three plots were required for the carrying out of the experiment:—

1. 75lbs. of 17 per cent. Basic Slag.
2. 75lbs. of 22 per cent. Superphosphate.
3. 97lbs. of 17 per cent. Basic Slag.

The 97lbs. of 17 per cent. Basic Slag contains the same quantity of phosphoric acid as the 75lbs. of Superphosphate. Therefore, the 75lbs. of 22 per cent. Superphosphate, containing 22 per cent. phosphoric acid, is compared with—

(a) The equivalent of phosphoric acid in basic slag.

(b) The same weight of 17 per cent. basic slag.

The plots which had an area of half-acre, were planted in duplicate.

The plot yields obtained, together with the average yields, are tabulated hereunder:—

EXPERIMENTS AT WAGIN—BASIC SLAG EXPERIMENT.

GRAIN YIELD.

Variety, "Guyra." Rate of seed, 50lbs. per acre. Planted 11th April, 1927.

Rate of Fertiliser per acre.	Relative Quantity of Phosphoric Acid.	Computed Yield per Acre.				Average Yield per Acre.		Percentage Yield.
		Section 1.		Section 2.				
		bus.	lbs.	bus.	lbs.	bus.	lbs.	
75lbs. Basic Slag	77	21	10	24	11	22	30	72
75lbs. Superphosphate ...	100	31	30	31	30	31	30	100
97lbs. Basic Slag	100	29	11	29	24	29	17	93

The above results which are for one year only, indicate that the general practice of applying superphosphate can be continued with confidence with the oat crop.

FIELD EXPERIMENTS WITH WHEAT AND OATS—WONGAN HILLS LIGHT LANDS FARM.

I. THOMAS, Superintendent of Wheat Farms.
A. R. VENTON, Farm Manager.

On the whole, the season was not a favourable one in this district, although early in the season prospects were very bright.

The monthly rainfall, as officially recorded during the year, together with averages for the past 15 years, is hereunder:—

					Growing Period.									
	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Total.	Nov.	Dec.	Total.
1927	...	7	301	34	143	221	260	89	57	50	820	5	11	1,178
15 yrs. average ...	47	51	101	67	195	300	272	198	133	92	1,190	38	50	1,534

During the growing period (May-October) the rainfall was 8.20 inches, the average for fifteen years being 11.90 inches. This is generally considered to be favourable for this (light land) class of country. A glance at the rain records, however, shows that whilst the first half of the growing period (May-July) was very favourable indeed, 6.24 inches being recorded against an average of 7.67 inches, the latter half was distinctly unfavourable. During this period (August-October) only 1.96 inches were recorded against an average of 4.23 inches. This amount fell on 32 different days, and was usually followed by drying winds, and consequently the crops did not get the full benefit and did not yield so well as was first expected.

The soil on which the experiment was carried out was, with the exception of the Rate of Superphosphate and the Potash Experiments, which were on the tussocky type of plain, mainly of smokebush type of country. This is the second time this land has been cropped, the first time being 1925/26.

The seed and superphosphate were sown at different rates to suit the requirements of the experiments.

RATES OF SEEDING EXPERIMENT WITH WHEAT.

This experiment has been conducted at this farm for the past three years; the wheats planted are Nabawa and S.H.J., representing free stooling and sparse stooling varieties respectively.

The plots were ploughed with a sundercut cultivating plough early in July and were skim ploughed in late August with the same implement to turn in heavy stubble missed by the initial ploughing. They were again lightly disc cultivated late in September to kill weeds and self-sown plants. In April and again prior to planting they were springtyne cultivated.

The tabulated results for the two types of stooling varieties are given below.

TABLE 1.—RATE OF SEEDING EXPERIMENT.

GRAIN YIELDS.

Early Variety, S.H.J. Planted 25th May, 1927. Superphosphate 112lbs. per acre.

Rate of Seed per acre.	Computed Yield per Acre.										Average Yield, 1927.	Percentage Yield, 1927.	Average Yield, 1925–27.	Percentage Yield, 1925–27.
	Section 1.		Section 2.		Section 3.		Section 4.		Section 5.					
	bus.	lbs.	bus.	lbs.	bus.	lbs.	bus.	lbs.	bus.	lbs.	bus. lbs.		bus. lbs.	
60lbs.	*		7	20	8	20	6	44	6	24	7 12	99	12 49	101
45lbs.	7	36	8	16	7	24	6	44	6	24	7 17	100	12 42	100
90lbs.	8	20	8	32	7	36	6	40	6	36	7 33	104	13 15	104

* Owing to an accident when being harvested, the yield from this plot was so obviously below normal that the result is not given.

TABLE 2.—GRAIN YIELDS.

Variety—Nabawa. Planted 20th May, 1927. Superphosphate 112lbs. per acre.

Rate of Seed per acre.	Computed Yield per Acre.										Average Yield, 1927.	Percentage Yield, 1927.	Average Yield, 1925–27.	Percentage Yield, 1925–27.
	Section 1.		Section 2.		Section 3.		Section 4.		Section 5.					
	bus.	lbs.	bus.	lbs.	bus.	lbs.	bus.	lbs.	bus.	lbs.	bus. lbs.		bus. lbs.	
60lbs.	9	12	10	44	11	24	10	40	10	28	10 30	103	17 19	101
45lbs.	10	16	10	44	10	0	10	28	9	16	10 9	100	17 13	100
90lbs.	11	52	11	12	10	8	11	16	10	8	10 55	108	17 38	102

From the percentage results for this year's experiment it would appear that the results were in favour of the heavier rates of seeding for both varieties, particularly the freer stooling variety, Nabawa. This is not supported by the actual yields obtained from the plots, which show that the increased yield was very little in excess of the extra amount sown, and in the average yields obtained during the three years' period the experiment has been conducted the extra amount of seed sown was not returned. Therefore, from the results of this experiment to date it can be concluded that no advantage is gained by increasing the rate of seeding above 45 lbs. per acre.

RATES OF SEEDING EXPERIMENT WITH OATS.

This year is the second in the course of this experiment. The two types are represented by Algerian, a late free-stooling variety, and Burt's Early, an early and sparse-stooling variety.

The preparation of the land was similar to that for the wheat section. The tabulated results are given below:—

TABLE 3.
RATE OF SEEDING EXPERIMENT.
OAT SECTION.

Variety, Algerian. Planted 13th May, 1927. Superphosphate 112lbs. per acre.

Rate of Seed per acre.	Computed Yield per Acre.										Average Yield, 1927.		Percentage Yield, 1927.	Average Yield, 1926–27.		Percentage Yield, 1926–27.
	Section 1.		Section 2.		Section 3.		Section 4.		Section 5.							
	bus.	lbs.	bus.	lbs.	bus.	lbs.	bus.	lbs.	bus.	lbs.	bus.	lbs.		bus.	lbs.	
40lbs.	16	32	19	16	19	16	15	24	15	8	17	11	109	17	27	117
30lbs.	16	32	18	8	17	32	14	24	12	0	15	34	100	15	5	100
60lbs.	19	0	19	16	19	0	15	24	19	24	18	21	117	18	4	120

TABLE 4.

Variety—Burt's Early. Planted 12th May, 1927. Superphosphate 112lbs. per acre.

Rate of Seed per acre.	Computed Yield per Acre.										Average Yield, 1927.		Percentage Yield, 1927.	Average Yield, 1926–27.		Percentage Yield, 1926–27.
	Section 1.		Section 2.		Section 3.		Section 4.		Section 5.							
	bus.	lbs.	bus.	lbs.	bus.	lbs.	bus.	lbs.	bus.	lbs.	bus.	lbs.		bus.	lbs.	
40lbs.	19	8	19	16	27	0	25	16	26	0	23	16	100	18	23	99
30lbs.	19	32	17	32	27	0	25	24	27	0	23	17	100	18	30	100
60lbs.	19	24	23	8	26	28	26	32	25	8	25	1	107	19	24	105

The results for this year confirm those of the previous year, viz., that with a free-stooling variety like Algerian, increased yields are obtained when the heavier rates of 40 lbs. and 60 lbs. of seed per acre are sown. Of the two rates, however, the average results for the two years disclose that the sowing at the rate of 40 lbs. per acre is the most economical, because the increased yields obtained from the plots sown with 60 lbs. of seed per acre are not sufficient to compensate for the extra amount of seed required for planting.

As was the case the previous year with the sparse-stooling variety, Burt's Early, there was no difference between the yields obtained from the plots sown with 30 lbs. and 40 lbs. of seed per acre, but the yields of the plots sown with 60 lbs. per acre were increased this year.

These results are supported by the average results for the two years the experiment has been conducted. These average results, however, indicate that the increased rate of sowing is not warranted, because the increase in yield is not sufficient to compensate for the extra amount of seed required for planting.

RATE OF SUPERPHOSPHATE EXPERIMENT.

The rate of superphosphate experiment is conducted to determine the most profitable quantity of superphosphate to apply on this type of country for wheat. Three rates are used, viz., 75 lbs. (control), 150 lbs., and 225 lbs. per acre.

The variety Nabawa was planted on the 13th May at the rate of 45 lbs. of seed per acre.

During the growing period a considerable difference, particularly in the stooling, could be noticed between the two heavier rates of superphosphate and the control plot (75 lbs. per acre). The whole of the experiment presented an even and attractive appearance, but that of the heavier rates was much better than that of the 75 lbs. per acre.

The results for this experiment, together with the average results for the past three years, are shown hereunder:—

TABLE 5.

RATE OF SUPERPHOSPHATE EXPERIMENT.

GRAIN YIELDS.

Variety—"Nabawa." Rate of Seed—45lbs. Date planted 18th May, 1927.

Rate of Superphosphate per Acre.	Computed Yield per Acre.					Average Yield. 1927.	Percentage Yield 1927.	Percentage Yield 1925-27.
	Section 1.	Section 2.	Section 3.	Section 4.	Section 5.			
	bus. lbs.	bus. lbs.	bus. lbs.	bus. lbs.	bus. lbs.	bus. lbs.	%	%
150lbs.	16 26	17 24	16 48	17 8	16 40	16 53	113	128
75lbs.	15 44	15 4	14 28	15 4	14 24	14 57	100	100
225lbs.	16 44	16 40	17 8	17 4	16 44	16 52	113	129

These results confirm the conclusion, already arrived at from previous years' experiments, that the amount of 75 lbs. of superphosphate per acre can be considerably increased with advantage on this class of soil.

MIXED FERTILISER EXPERIMENT.

The object of this experiment is to determine whether any advantage is derived by supplementing the fertiliser, superphosphate, by a potassic manure for growing a wheat crop on light land.

Three fertilisers were used and applied as follows:—

Plot 1.—150 lbs. Superphosphate per acre + 56 lbs. Muriate of Potash per acre.

Plot 2.—150 lbs. Superphosphate per acre.

Plot 3.—150 lbs. Superphosphate per acre + 140 lbs. Kainite per acre.

This section of plots, each one-eighth of an acre in area, was repeated five times. The quantity of potash in 56 lbs. of the muriate is equal to that in 140 lbs. of kainite.

Four weeks prior to planting and immediately after the land had been cultivated these two potassic fertilisers were applied to the respective plots. This course was deemed advisable owing to the possible injurious effect on the young plants when manures of this class are applied direct with the seed.

The variety Nabawa was planted at the rate of 45 lbs. of seed per acre. At the same time (1st June) 22 per cent. superphosphate was applied to each plot at the rate of 150 lbs. per acre.

Throughout the growing period no appreciable difference could be noticed between these plots.

The results of this experiment are set out in the table hereunder:—

TABLE 6.

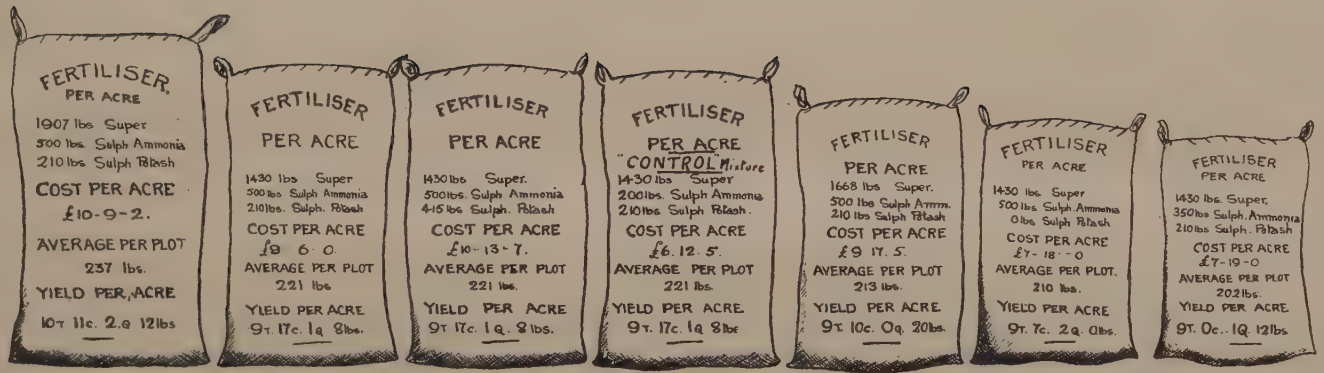
MIXED FERTILISER EXPERIMENT.

Variety—"Nabawa." Grain Results. Planted 27th May, 1927.

Fertilisers applied per Acre.	Computed Yield per Acre.										Average Yield per acre, 1927.		Percentage Yields, 1927.
	Section 1.		Section 2.		Section 3.		Section 4.		Section 5.				
	bus.	lbs.	bus.	lbs.	bus.	lbs.	bus.	lbs.	bus.	lbs.	bus.	lbs.	%
Muriate of Potash 56lbs. ; Superphosphate 150lbs. ...	11	12	11	56	13	20	14	0	11	44	12	26	102
Superphosphate 150lbs. ...	11	20	12	4	11	52	12	24	13	28	12	14	100
Kainite, 140lbs. ; Superphosphate, 150lbs.	12	0	12	40	12	36	12	8	12	32	12	23	101

These results show a very small increase in the yields of the plots to which potassic fertilisers had been applied.

The difference is so small, and the results of the experiment being for one year only, no definite conclusions can be drawn.



Graph showing composition and application of fertiliser per acre and also the cost and computed yields per acre.

FERTILISER TRIALS AT BUREKUP.

JULY—NOVEMBER, 1927.

G. N. LOWE,
Senior Potato Inspector.

The experiments were carried out on the property of Mr. C. L. Clarke and formed one of a series which is designed to find out, if possible, a suitable and economical potato manure. At a later date an abstract of these manurial experiments will be published. It was felt, however, that certain details of this last experiment would prove of interest to growers in different parts of the State.

The land was of a clayey, loamy nature, and typical of the class of country usually planted with the winter crop in this district. Half an acre was marked off, this being divided into plots, each 2½ chains in length and 2ft. 6in. wide, making an area of 1/100 of an acre per plot. The land was well ploughed to a depth of 6in. and the sets were placed on the side of the furrow some 2in. from the bottom. Each fertiliser variation was repeated six times and each of these variations was compared with the yield obtained by the use of a standard "control" mixture. The plots were arranged chequer fashion to obviate as much as possible the effects of soil variation. In spite of the care which was taken to secure as uniform a patch as possible, a portion of the western side suffered slightly from too wet a condition. The manurial variations were differences in the relative weights of nitrogen, phosphoric acid, and potash. The control mixture was 1,430lbs. super., 210lbs. sulphate of potash, and 500lbs. sulphate of ammonia. This mixture was not taken as the ideal mixture but simply as a basis of comparison. It is interesting to note, however, that this mixture, which has been the standard "control" in the departmental experiments for the last four years, has been very consistent in maintaining a high yield. In this particular experiment it takes the second place from the point of view of yield per acre.

It was noticeable that the general average yield of the experimental plots was much higher than that of the adjacent crops, in some instances just trebling the tonnage. The local growers used a potato manure which contains no potash. This increase of yield was undoubtedly largely due to the use of selected seed and the attention paid to details of planting and of general cultivation. Large "Delaware" seed was used. This seed was selected from potatoes dug in the Benger Swamp. They were cut up into 2oz. "sets," according to the method recommended by the Potato Branch, and about 12 cwt. of seed per acre was planted. The subsequent cultivations were the same as those usually given in the Burekup district.

The results obtained from this experiment were collected together and a graph has been prepared from them. The bags represent the relative yield of each plot. On each bag is printed the yield obtained, the weight and cost of the manure used.

After a study of the accompanying graph it will be seen that the heaviest yield, viz., 237lbs. per plot or a yield of 10 tons 11cwt. 2qrs. 12lbs. per acre, was that obtained from the heaviest weight of fertiliser per acre. In actual bulk 23cwt. This is much more than that used by local growers, who generally sow about 14-18cwt. per acre. The actual mechanical effect of this bulk of manure may have had some effect in obtaining this comparatively high yield of potatoes. It has been demonstrated in recent trials that

by increasing the amount of super as a manure, the resulting yield is increased. This indication is being followed up in future experiments.

The next three bags reveal an anomaly. Exactly the same yield was obtained by using 500lbs. and 200lbs. of sulphate of ammonia. This seems to suggest that too much ammonia can be applied. Here again our previous experiments have tended to prove this, for increase of ammonia did not always mean increase of crops. Here it may be mentioned that not any of the plots were subsequently top-dressed. All fertilisers were applied in the furrows at the time of planting. It is of course possible that young potato plants can only make use of a definite amount of nitrogen. Should the soil be fairly rich in humus, the addition of more nitrogen would not only be wasteful but detrimental to tubering. Thus it would seem a question of soil condition combined with the helpful intelligence of the grower as to what weight of ammonia should be applied. Ammonia is an expensive fertiliser. A comparison of the actual cost of the two manures shows a difference of £2 13s. 7d. per acre. Ammonia, like potash, is very soluble in water, but is well absorbed by stiff soils and soils containing clay. There is therefore no great danger of its being leached out of such soils by rain. On sandy soils slightly heavier dressings of these fertilisers should be given to allow for leaching.

With regard to potash; this fertiliser has the special function of promoting the formation of starch. Potatoes which show a high content of starch are heavy feeders on potash. Its effect on the crop is not very noticeable in the field, but a lack or abundance of potash is clearly shown by the weight and quality of the crop at the time of digging. This agrees with the result obtained where no potash was included, where there was a decrease of 11lbs. per plot or a difference of 10cwts. per acre. Not only was there a decrease in yield, but an analysis of potatoes, taken from the non-potash plots, shows a decidedly lower percentage of starch than those taken from potash plots.

In addition to the fertiliser experiments which are plotted in the graph, there was also a comparison made with seed treated with the "wet bag treatment" and seed planted directly "off knife" or untreated. The "wet bag treatment" is quite simple, but apparently of great importance to the potato growers. Numerous reports of the successful application of this method, which has been advocated by the Potato Branch for some time, have been received in this office. These reports all indicate that the "wet-bag treatment" of seed increases the subsequent crop—a result borne out by our own experiment. As a preliminary all the seed potatoes are emptied out on the ground and potato bags are taken and soaked in water. The potatoes are cut into 2oz. "sets" and these "sets" are placed back in the soaked bags. The wet bags of cut "sets" are left in a cool place for a period of 24-48 hours prior to planting or until such time as it takes for the cut surface to gradually callous over. It is found that a hard layer of "suberin" or corky material will form in the cut tissues. This layer stops the leaching of cell sap from the cut potatoes and also prevents the introduction of bacterial or fungoid troubles into the "set." It was found that over a series of twelve plots, each of which received the same manuring, six of which had been sown with "treated" seed and six with "untreated," that the balance of yield in favour of the "treated" seed was 1 ton 19cwt. 1qr. 4lbs., or approximately 2 tons per acre.

Also in view of the fact that many growers are of the opinion that potatoes can be grown successfully with super. and an application of sulphate of ammonia as a top dressing, this practice was tried out over four

plots. The general average of the rest of the plots of the experimental area was taken and this gave a yield of 218lbs. per plot, or a yield of 9 tons 14 cwt. 2qrs. 16lbs. per acre. This yield includes that from six plots in which a manure containing no potash was used. The yield obtained from the use of super in the furrow and an application of sulphate of ammonia as a top-dressing gave a return of 172lbs., or a yield of 7 tons 13cwt. 2qrs. 8lbs., a difference of 2 tons 1cwt. 1qr. 8lbs.

Another two plots were manured with a commercially blended non-potash fertiliser. The return from these plots was only 137lbs. per plot, or at the rate of 6 tons 2cwt. 1 qr. 8lbs. per acre. This agrees with the results obtained from the adjacent commercial crops where a yield of only 3½ tons per acre was dug.

Summary.

1. There seems to be a possibility that an increase of super. above 1,430lbs. per acre (the weight in our standard control) may be economically sound. In other words the value of the crop will more than equal the increased cost of the manure.

2. In this particular class of soil the "effective" amount of sulphate of ammonia would seem to be approximately about 200lbs. per acre.

3. An increase of potash tends to an increase in yield and quality of the crop.

4. That top dressing with sulphate of ammonia when the crop is just breaking ground is not so successful when super. only is used at planting as the same quantity of each applied in the furrow at planting.

5. The "wet bag" treatment not only materially assists germination but likewise induces a heavier yield, but the reason is not determined.

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Any quantity up to One Ton per Acre.

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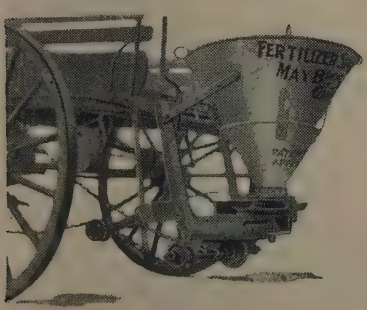

The Patent **SPREADER** is designed to work attached to motor lorry or horse-drawn vehicle. Will distribute over any country where a horse can travel. Capacity 50 to 100 acres per day. The Special **PATENT TWO-PIECE HOPPER** allows Gypsum or Sticky Super to flow like sand. When ordering state make of Motor Lorry.

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2—4

THE TANGIER PEA.

G. K. BARON-HAY, B.Sc. (Agric.),
Assistant Superintendent of Dairying.

Introduction.

The Tangier Pea (*Lathyrus tingitanus L.*) is an annual indigenous to Northern Africa, but has been grown as an ornamental plant in Europe for many years.

It was first recommended and grown as a fodder by Dr. Trabut, of Algeria, where it is used as winter forage. It is cultivated also in the Canary Islands and Morocco

Although first introduced to the United States in 1900,[1] it was not till some 20 years later that its great value as a fodder and green manure crop was recognised, and C. V. Piper, United States Department of Agriculture, reports in 1922[2]:—"It has given the largest yields of green matter to the acre of any annual legume grown in California. The dense growth chokes out weeds completely. It is a good green manure crop, but the seed has been hard to get. There is hope that this difficulty may be overcome."

The Tangier Pea is also cultivated as a fodder plant in the South of France, where it is said to be very hardy and able to withstand a temperature as low as 26 degrees Fahrenheit. In this connection P. de Sornay[3] reports:—"It is a first class fodder plant and thrives very well. It is sown at the beginning of the rains, and its stems rapidly cover the soil. Cattle eat it readily. Attempts should be made to acclimatise this legume in various sub-tropical countries."

Mr. W. E. Barker,[4] Sequin, Washington, writes in 1923:—"I grew the Tangier Pea on the poorest pieces of land on the farm—land that had been cropped to wheat for fifty years. It grew about 7 feet high and made an impenetrable jungle."

On reading these eulogistic reports, it was thought possible that the Tangier Pea would fill a useful place in the agriculture of this State, and a small packet of seed (2 ounces) was secured through the courtesy of Professor P. B. Kennedy of the Agricultural Experimental Station, California. These seeds were distributed amongst the State Experiment Farms at Nabawa, Merredin, Wongan Hills, and Denmark, and also Mr. A. T. O'Connell, Dwarda.

Description.

The Tangier Pea (*Lathyrus tingitanus*) is an annual, which in general appearance and growth resembles the ornamental Sweet Pea.

The plant shows slow growth during the winter months, but as warm weather approaches the growth is very rapid and strong, and during September the plant quickly attains a height of from 3 to 7 feet, in a tangled mass, producing a dense covering which chokes out all but the strongest weeds.

The Tangier Pea is drought resistant to a high degree, owing to its deep-rooting habit, the roots also having numerous large nodules.

1. Ball, C. R.; Grasses and Fodder Plants on the Potomac Flats, U.S. Dept. Agriculture, 1900.
2. Piper, C. V. and Pieters, A. J.: Green Manuring, U.S. Dept. Agriculture, Bulletin 1250, 1922.
3. P. deSornay: Green Manures and Manuring in the Tropics, 1916.
4. P. B. Kennedy: The Tangier Pea. Univ. of California. Circular 290, 1925.

The plant is smooth, with coarse flattened stems and prominent stipules. The leaves consist of a pair of large lanceolate leaflets, the midrib of the leaf terminating in a much branched tendril by which the plant supports itself.

Showing deep rooting habit, with numerous nodules.

The flowers resemble Sweet Pea blossoms but are small and scarlet in colour. The clusters bear generally two, sometimes three, blooms.

The pods are about 3 inches long, containing 5-8 seeds which are brown, elliptical, flattened and about ¼ inch long.

Seeds of Tangier Pea. Enlarged and natural size.

Result of Trials in Western Australia.

Mr. A. T. O'Connell, Dwarda.

Rainfall.	May.	June.	July.	August.	Sept.	Oct.	Total Useful Rain.
1926	426	418	950	270	361	371	27·96
1927	265	709	494	323	257	260	23·08

100 seeds were supplied to Mr. O'Connell in May, 1926.

Soil: Well drained clay loam.

Planted: Second week June.

Growth very slow and straggly till middle of August, when colour became healthy and plants attained a height of 6 feet on 28th November, at which time it was in full bloom.

The crop was quite green and succulent on 10th December, after this date ripening commenced, and the crop was quite ripe by the end of December.

Seed obtained: 10lbs. 2ozs., a remarkable yield from about 1 ounce of seed.

Results, 1927:

Mr. O'Connell, the following season, planted ¾ acre with Tangier Pea under field conditions.

Soil: Clay loam to light sandy loam.

Planted: 30th April, with a drill.

Fertiliser: 138lbs. superphosphate per acre.

Seed: 8lbs. per acre.

May 12th: 1½ inches high.

May 22nd: First pair of leaves opened. Tendrils on some.

June 5th: 6-9 inches high. Second shoots appearing.

July 13th: Runners 10 inches long.

Aug. 8th: Peas very healthy colour. Runners 20 inches.

Aug. 31st: Stooling freely.

Oct. 22nd: Growing strongly, 2ft. 6in.-3ft. high. Few flower buds showing.

Oct. 30th: 4 feet high.

Nov. 6th: 5ft. 9in. high. In full bloom. Growing strongly.

Nov. 13th: 6ft. 6in. high.

Nov. 20th: 6ft. 8in. Some 7ft. 5in. Full bloom passing. Still quite green.

Wheat was being stripped alongside the field trial, while the Tangier Pea was still green and blooming.

A late crop, sown on July 16th, had 80 per cent. germination in thirteen days, in spite of heavy frosts. This crop remained green up to Christmas time.

MERREDIN EXPERIMENT FARM.

Rainfall.	May.	June.	July.	August.	Sept.	Oct.	Total Useful Rain.
1927	53	164	132	89	167	64	6·69

Field Trial with Tangier Pea, 1927. Mr. J. T. O'Connell's Farm, Dwarda. Photo. taken 29th November.

Field Trial, Dwarda, 1927. Note dense tangled growth which choked out all weeds.

"Planted 20th May, 1927, but did not germinate till towards end of June. Germination poor and growth during winter months slow and weakly. With warmer weather, growth became more rapid. The plants are still quite green (Nov. 10th) and evidently require a fairly long season to mature."

WONGAN HILLS LIGHT LANDS FARM, 1927.

Rainfall.	May.	June.	July.	August.	Sept.	Oct.	Total Useful Rain.
1927	143	221	260	89	57	50	7·86

Soil: Light sandy, smoke bush country.

Planted: June 8th on land fallowed June, 1926.

Fertiliser: 1cwt. superphosphate per acre.

Germination slow, 60 per cent.; remainder germinated in spring.

Growth very rapid during September and October; stalks varying from 7-20 on each plant, being from 2 feet to 3 feet 6 inches in length.

Nov. 11th: In full bloom; plants green and succulent.

The Superintendent of Wheat Farms (Mr. I. Thomas) considers these results very promising, especially on such a light soil, and the plant may provide a means of lengthening the period during which green fodder is available.

As a Forage Plant.

As some guide to the feeding value of the Tangier Pea, samples of the plant were submitted to the Government Analyst (Dr. E. S. Simpson) for analysis.

The following table shows the Tangier Pea compared with White Dutch Clover and the Common Vetch:—

	Water.	Ash.	Crude Protein.	Carbohydrates.		Fat.
				Fibre.	Nitrogen. Free Extract.	
White Dutch Clover	8·1	8·0	16·2	23·2	41·6	2·9
Vetches (common)	7·1	8·2	17·3	26·2	38·7	2·8
Tangier Pea	6·36	6·12	17·94	25·12	40·62	3·84

It will be seen that the Tangier Pea closely approximates to the values of these two legumes, as revealed by chemical analysis.

Mr. O'Connell reports that the Pea is relished by all stock, which smashed a fence against which the plants were growing in order to reach them.

The leafage and stalks are eaten by stock, and, in Algeria and California, where considerable quantities have been fed to stock, no deleterious effects have been recorded.

TANGIER PEA STRAW.

	Moisture.	Ash.	Crude Protein.	Carbohydrates.		Fat.
				Fibre.	Nitrogen. Free Extract.	
1.—Bean Straw	11·07	6·97	5·68	41·10	33·63	1·52
2.—Oaten Hay	8·6	4·7	3·80	31·0	49·2	2·6
3.—Oaten Straw (Stubble) ...	11·5	5·4	3·60	36·3	40·8	2·4
4.—Tangier Pea Straw ...	10·00	10·64	6·42	37·10	34·06	1·78

1. Hendry, G. E.: Bean Culture in California. Bulletin 294. California Agricultural Experiment Station.
2. West Australian figures.
3. Henry and Morrison: Feeds and Feeding.
4. P. B. Kennedy: The Tangier Pea. Circular 290. University of California.

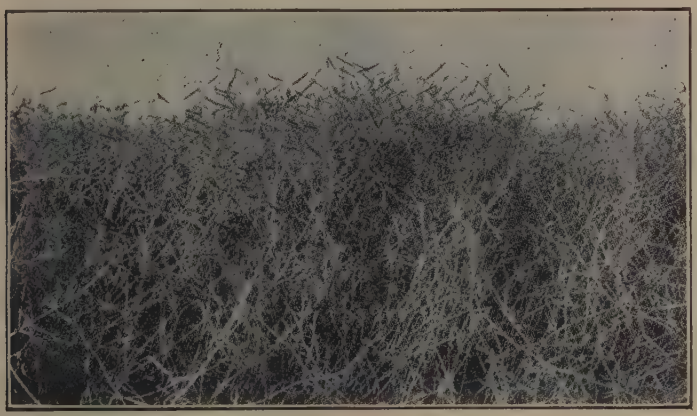
Value of Straw.

Mr. O'Connell has found that all stock—sheep, horses, and cattle—eat the Pea straw with relish, cattle in particular being very keen on it.

While it is not advisable that the straw should be considered suitable as a feed for stock, by itself, there is no doubt that the straw, when chaffed, would make a valuable bulk feed, especially for cattle.

The following comparisons of Tangier Pea straw with Bean straw, Oaten hay (local), and Oaten stubble indicates that the Tangier Pea straw has a decided feeding value and compares more than favourably with Oaten stubble.

For feeding to cattle it is advisable to chaff the straw and moisten it some hours before feeding.



A crop ready to harvest. The straw is fine and relished by stock.

Summary.

1. The Tangier Pea shows great promise as a fodder plant and for green manuring in districts with 16 inches winter rainfall or over.

2. Early autumn planting, in April or early May, is recommended.

As the plant grows but little during the cold winter months, this early planting is important.

3. The plant requires 6-7 months to reach maturity, and in districts indicated in paragraph 1 above should lengthen the period during which green fodder is available by at least six weeks.

4. Grown with oats, it gives promise of being an excellent crop for silage.

A limited number of sample packets of seeds are available for distribution to farmers wishing to try this crop, on application to the Director of Agriculture, Department of Agriculture, Perth.

TOXIC PARALYSIS OF SHEEP.

H. W. BENNETTS, M.V.Sc.,
Veterinary Pathologist.

In the last issue of this *Journal* (December, 1927), a short description of the condition termed "toxic paralysis of cattle" was given. Though this condition of *carrion* poisoning commonly affects cattle, it has not previously been described as affecting sheep in this State, and only rarely in other localities.

Recently sheep mortality due to this cause has been brought under our notice, and as the condition, which is a characteristic one, may be more common than reported, a description is merited.

History.—The mortality occurred in a property in the Merredin district during the month of January of this year. The total flock, run in one mob, consisted of 400 mixed sheep. For some weeks the sheep had been depastured in a wheat stubble paddock; shifting to an adjoining stubble paddock did not prevent deaths.

Losses had been occurring for some three weeks prior to visit of inspection; twelve sheep had died and three were found sick. In every case where symptoms had been observed death had occurred. All the sheep were in good condition, the affected sheep were almost invariably the fattest and usually wethers, viz., those most likely to forage.

Both stubble paddocks, on which sheep were depastured, contained rabbit warrens which had been treated with carbon bisulphide during the winter months. Rabbits, apparently, had recently dug out many of the burrows and unearthed numerous old rabbit carcases.

Sheep were seen to be eating these, and there was evidence that they had been doing so for some time.

Cause.—This fact, combined with the characteristic symptoms shown by affected sheep, was evidence that the trouble was due to the ingestion of rabbit carcases containing a toxin-producing organism (*Bacillus parabotulinus* or *Bacillus botulinus*). Apart from presence of rabbit carcases there was nothing abnormal about pastures. A diagnosis of Toxic Paralysis or *Carrion* Poisoning was accordingly made. This was subsequently confirmed by bacteriological tests. It is noteworthy that toxic paralysis affecting cattle following ingestion of rabbit carcases is known in the district.

Symptoms.—The initial symptoms are a wriggling of the tail as though fly-blown, followed by inability to eat or drink; the head being held in a drooped position, the lower jaw hanging down, and from the open mouth there is a more or less continuous and profuse flow of frothy saliva. The gait is stiff and the animal appears dull. Constipation is present and urine comes away in dribbles. In advanced cases there is a difficulty in breathing, the respiration being spasmodic and abdominal owing to partial paralysis of

chest muscles. Affected animals frequently lie down, and towards the end are unable to get up, and die quietly without a struggle, in normal lying-down position.

In this outbreak the condition was a very acute one—death occurring within several to 24 hours after symptoms were first noticed. It is quite likely that sheep eating smaller amounts of carrion or carrion containing less toxic material might show more chronic or indefinite symptoms as described previously for cattle.

Forage poisoning should be suspected in sheep mortalities where members of the flock have previously been noticed to have a depraved appetite, manifested by ingestion of carrion, etc.

Post Mortem.—There are no characteristic changes to be found in a fresh carcase dead from this disease (putrefaction of sheep carcases is rapid particularly during the summer). The gall bladder in one case examined was enlarged and the kidneys slightly congested. Remnants of bones, etc., may be found in the stomachs.

Treatment.—There is no satisfactory treatment.

Prevention—

1. Remove depraved appetite by supplying the minerals lacking in diet in form of a lick:—Bone meal 4 parts, Salt 1 part.
2. Collect all bones, rabbit and other carcases from pastures, and destroy by burning.

CAULIFLOWERS.

J. C. PALMER, Dip. Agric.,
Potato Inspector.

There is always a good demand for cauliflowers in the markets. It is a vegetable that is not very easy to grow and consequently the householder is apt to rely on the local market for supplies rather than the home garden. Climate, soil conditions and the amount of available water are all important factors, which tend to make or mar a successful crop of cauliflowers. Since the edible part is the "head" or "flower," special precautions have to be taken to ensure that the cauliflower is marketed in the most attractive manner possible. It is the care and attention necessary to keep the "head" white which makes the cultivation a difficult matter. The successful grower is the one who grows systematically and carefully over a period of years. Such a grower will average a good price for his crop over a period of time in spite of the fluctuations of market which must of necessity occur by reason of the variations of supply and demand.

Soil.—The best type of soil for the cultivation of cauliflowers is one which has been well worked up and is rich in organic matter. Well drained river flats or alluvial flats are very suitable. Cauliflowers will grow on very light soils provided that a heavy dressing of organic manure is worked through them thoroughly. Experienced gardeners rarely plant the centre of a peaty swamp but prefer to make use of the outside edges of such land. In many places cauliflowers are used as a following crop after early potatoes. This is a good practice, for the land must be well worked and kept free from weeds to ensure the harvesting of a good potato crop.

Seed and Seedlings.—Seed is one of the most important factors in the production of a good crop. In the Eastern States the growers pay very high prices for their seed, and in some cases as much as £3 per lb. has been paid. Cheap seed means that a large proportion of useless plants will be obtained. Further, the cauliflower seed has been obtained as the result of careful breeding and selection on the part of the specialists, and so of necessity must be fairly costly. It is better to buy seed from good and reliable seedsmen rather than to save seed from the growers' own plants and strain. Cauliflower seed should be from known strains and have a germination capacity of at least 90 per cent. Since there is little, if any, difference between seed which is one or two years old, many growers order twice as much seed than is necessary for their requirements. In the event of a good crop of high quality cauliflowers being obtained from the first sowing then the surplus seed can be used in the following season. It is usual to plant the seed in beds. These beds might be arranged so that it is possible to weed them from either side. A bed 20ft. x 4ft. will provide enough plants for planting an acre. The seed can be broadcasted, and in practice it is found that ¾lb. will provide enough plants for an acre. If the seed is drilled, allow a distance of 4in. between the rows and 1oz. seed should sow a length of 200ft. Other growers plant their seed in boxes. After planting, cover the seed to a depth of about ½in. only. The surface of the seed bed must be kept firm and moist. For early crops it is possible to sow during December,

and late crops up till June, but it is better that the main crop be sown about February, provided the weather conditions are suitable. This main crop will be ready in June and July. When the young plants are about 1in.-1½in. high they should be dusted with a mixture of air-slaked lime and tobacco dust (in the proportion of slaked lime 2 parts, tobacco dust 1 part). This mixture can be dusted over the plants in the early morning when the plants are moist with the dew. The mixture acts as a deterrent against insect pests. Applications can be made through the seedling stage till the plant is starting to "head" in the field. "Damping off" is also more common in over-crowded, over moist and poorly cultivated beds. Frequent light waterings consequently are not as beneficial as thorough wettings at longer intervals. The beds should not be watered on very hot sunny days. The beds must be kept well weeded and the surface stirred frequently, hence there is a distinct advantage derived in drilling the seed in rather than in broadcasting it over the seed-plots. In moderation, sunlight is a fine preventative against this disease which seems so prevalent amongst young cauliflower plants. It is also desirable to use, if possible, fresh seed beds every year to minimise the danger of "damping off" and other seed-bed diseases.

The care taken in raising good stocky healthy plants means the success or failure of the crop grown in the field. The grower who grows his own seedling plants is surer of the strain of his plants than the grower who is content to buy his seedling plants from the local seedsman. In successful cauliflower growing the "strain" of the plants is very important.

Transplanting.—The seedling plants are ready for transplanting when they are about 4in.-6in. high, or about the fourth leaf stage. The seedling plants should be raised and if possible a ball of earth left round the rootlets of each plant. The young plants, after being placed in a box, are covered with wet hessian. The box of seedlings is carried along the planting row, in front of the planter, and the plants dropped in position. The planter follows up and each plant is dibbled in. The plants should be well watered after planting. It is better to choose a dull, cloudy day or towards evening for planting to allow the seedling to get over the shock of the transplanting. Some growers recommend that the seedlings in the seed-bed be allowed to harden somewhat by withholding water from them just prior to transplanting. This also renders the plants less flaccid or "watery." The plants are then set out in rows 3ft. apart and 2ft. to 3ft. in the rows. Hot weather during transplanting may tend to check the seedling plants very much: this should be avoided as much as possible. It is estimated that 5,800 plants per acre are necessary to plant an acre at 3ft. apart and 2ft. 6in. in the rows; 4,840 at 3ft. in the rows.

Manuring.—The cauliflower is a gross feeder and will respond to heavy dressings of manure. The best manure is, of course, well rotted farmyard manure. Growers in England use up to 20 tons per acre. Unfortunately there is not a large quantity of farmyard manure available in many parts of this country, so artificials must be used. A useful manuring is 9 cwt. super, 1 cwt. sulphate of potash, 1½ cwt. sulphate of ammonia per acre, applied in the furrow. Follow with a top-dressing of ½ cwt. nitrate of soda per acre when the plants are well established. If the plants are making a slow growth, or if they appear yellowish green, add further dressings of nitrate of soda at the same rate.

Cultivation.—The ground should be rolled after planting, and well cultivated between the rows. Cultivation will keep down the weeds and so there will be no wastage of the manure. Cultivation can be done with horses till the plants are too big, then hand hoeing should be done whenever necessary. Where the plots are irrigated the watering should be carefully regulated. Frequent light irrigations (by overhead sprinklers) will tend to encourage surface rooting and also will help to check damage by insect pests. The main consideration is to keep the plants growing without a check. The faster and the more uniform the plants grow the better will be the crop. The most anxious period for the grower is just prior to the maturing period. Excessive heat at this time will cause yellowing or fuzziness of the head.

Defects.—Cauliflowers only fetch good prices when the head is free from certain well defined defects. These defects in the head are quite obvious and should be eliminated wherever possible. A very common fault is *over-maturity*, which can be obviated only by cutting slightly immature cauliflowers. Sometimes the head has a granulated appearance. This *riciness* is likely to occur when the crop matures during exceptionally warm weather. Some varieties of cauliflowers are subject to this fault and such strains should not be grown. Sometimes small green leaves appear between the segments. *Leafy head* is due to the use of low quality cauliflower seed and can be avoided by using high grade seed. Cauliflowers are cut to arrive on the market with the outer leaves green and the head a clear white colour.

In order to keep the head a nice attractive white colour, it is necessary to protect the head from exposure to too much weather, either sun, rain or frost. This is usually done during the growing period. Some growers break off a few of the larger outside leaves and place them over the head. Others bend over the larger inner leaves, then tie the outer leaves together with a band.

Harvesting.—Since cauliflowers must be cut when ready the crop will have to be examined every day towards the end of the growing period to ensure that as the heads become ripe they may be cut off about 3in. below the head. All the leaves, with the exception of those which are yellow or dirty, are usually left on to avoid damage of the head in transit. It is usual to cart the cauliflowers direct to the packing shed, so that they are left out in the sun as little as possible. Growers have obtained up to 400 dozen of cauliflowers per acre, and in the ordinary season this should prove a very remunerative crop.

Varieties.—A good seedsman can be relied on generally to supply high grade seed. Local experience is, however, the best guide to the varieties which may be planted. A few of the many varieties are—

Early Snowball—a very early variety, with a small compact head with a fine white attractive looking curd.

Eclipse—a summer variety which will stand dry, hot weather.

Early London—a large and hardy variety.

Veitches' Autumn Giant—one of the largest and best type of cauliflowers.

Dwarf Erfurt—a favourite variety with many growers.

FALLOW COMPETITION.

WYALKATCHEM AGRICULTURAL SOCIETY.

Judge—A. S. Wild, B.Sc. (Agric.), Agricultural Adviser.

Twenty entries were received for this competition. Of these, eleven submitted fallow for inspection.

The awards made are set out hereunder.

FALLOW COMPETITION.

WYALKATCHEM AGRICULTURAL SOCIETY.

Judge—A. S. WILD, Agricultural Adviser.

Competitor.	District.	Moisture.	Mulch.	Weeds.	Consolidation of Seed Bed.	Uniformity of Preparation.	Total.
		40 pts.	10 pts.	10 pts.	20 pts.	20 pts.	100 pts.
Tyler, J. E. ...	Korrelocking ...	28	9	9	16	17	79
Threlfall, G. ...	Korrelocking ...	26	9	8	16	18	77
Ferries, H. ...	Wyalkatchem —	26	9	8	16	16	75
Davies, W. ...	Benjaberring ...	26	9	7	15	17	74
Robinson, S. W.	Cowcowing ...	28	8	9	14	15	74
Lindsay, J. ...	Wyalkatchem ...	26	8	8	15	16	73
Lehman, C. E.	Cowcowing ...	26	8	9	14	15	72
Bowles, J. ...	Wyalkatchem ...	28	7	7	14	15	71
Hall, L. H. ...	Cowcowing ...	26	7	9	14	15	71
Hodgson, H. ...	Korrelocking ...	26	7	9	14	15	71
McKay, N. ...	Benjaberring ...	24	6	9	15	15	69

The cultural details, etc., of the various fallows inspected are as set out in the table hereunder:—

FALLOW COMPETITION.

WYALKATCHEM AGRICULTURAL SOCIETY.

Competitor.	J. E. Tyler.	G. Threlfall.	H. Ferries.	W. Davies.	S. W. Robinson.
Timber	Salmon, Gimlet, Ti-tree and Mallee	Salmon and Gimlet	Salmon and Gimlet	Salmon and Gimlet	Salmon and Gimlet with variations.
Ploughed ...	June	Early in June ...	June	July	July.
Make of Plough	Mouldboard ...	Mouldboard ...	Mouldboard ...	Sundercut ...	Disc
Depth	3 to 4 inches ...	4 inches ...	3½ inches ...	3 to 3½ inches ...	4 inches.
Condition of land at time of ploughing	Good	Good	Good	Good	Good.
Other cultivations	Disc ploughed in September and Springtyned in October	Scarified both in the middle of and at the end of September. Cultivated with Combine second week October. Harrowed 19th Nov. after 25 points of rain. Sheep run on fallow during Aug. and Sept.	Skimmed with Sundercut during August. Springtyned with duckfoot points at end of September. This was repeated during Jan. Sheep were run on the fallow	Springtyned in September	Cross cultivated in August. Harrowed in September. Part received extra harrowing during the Spring.

FALLOW COMPETITION—*continued.*

Competitor ...	J. Lindsay.	C. E. Lehman.	J. Bowles.	L. Hall.	H. Hodgson..	N. McKay.
Timber ...	Salmon and Gimlet	Salmon and Gimlet with variations	Salmon and Gimlet	Salmon and Gimlet	Salmon, Gimlet and Ti-tree	Salmon, Gimlet and Ti-tree.
Ploughed ...	July ...	July ...	June ...	June and July	July ...	End of August.
Make of Plough	Mouldboard	Disc ...	Mouldboard	Mouldboard	Sundercut ...	Disc.
Depth	4 inches ...	4 inches ...	4 inches ...	4 inches ...	3½-4 inches	3 inches.
Condition of land at time of ploughing	Good ...	Good ...	Good ...	Good ...	Good ...	Good.
Other cultivations	Cultivated with a wide point cultivator during Sept. Sheep were run on the fallow	Cross cultivated at end of August with Combine. Harrowed at end of Sept.	Skim ploughed with Sundercut in Sept. to a depth of 2½in. A small part had an extra Springtyning	Ploughed with Sundercut to a depth of 2in. in Sept.	Cultivated with Combine second week in Aug. This repeated at end of Aug. A small portion cultivated later	Early in September it was skim ploughed. Sheep werle run on fallow.

All the fallows inspected were very free of weed growth and very dry. The long, dry spell placed the heavy land at a disadvantage as regards moisture content when compared with the competing areas, which included lighter soil.

The winning fallow, that of Mr. J. E. Tyler, was on mixed country, salmon gum, gimlet, ti-tree and mallee being the original timber. It was ploughed in June, 1927, to a depth of three to four inches with a mouldboard plough, disc ploughed back to a depth of two inches during September and springtyne cultivated in October. At the time of inspection, the fallow presented a very even, clean appearance. The work on it appeared to have been carefully carried out. The land had been ploughed to an even depth and a level bottom secured. The subsequent cultivations had produced a good, even mulch, two to two and a half inches deep. The attractiveness of this fallow was somewhat diminished by the appearance resulting from the soil variations.

The entry of Mr. G. Threlfall, which was on salmon and gimlet country, had also been well prepared. The land had been ploughed during the first week in June, 1927, with a mouldboard plough to a depth of four inches. It was scarified during the middle of September and again at the end of that month. During the second week in October it was cultivated with a springtyne implement and on the 19th October, after 25 points of rain, it was harrowed. Sheep were pastured on the fallowed land during August and September.

The operations connected with the preparation of this fallow had been most carefully done. It, however, lost points for moisture and was marred somewhat by the presence of "prickly summer weed" (*Solanum hoplopetalum*), and Cockspurs, which, fortunately, were not numerous.

Mr. H. G. Ferries' entry was very creditable. It had been ploughed during June with a mouldboard plough to a depth of three and a-half inches. In August it was skim ploughed with a sundercut and at the end of September, cultivated with a springtyne cultivator, fitted with wide points. This

last operation was repeated during January. The resulting fallow was clean of weed growth, save for some "prickly summer weed." Although stated to be three and a-half inches, the depth of ploughing varied somewhat.

The fallowed area entered by Mr. W. Davies had a nice even mulch, except on odd hard patches. A quantity of "prickly summer weed" was present over the surface. Except for this, the land was clean of weed growth and roots. The appearance of this fallow was detracted from by the presence of a pad formed by stock moving over one portion.

Mr. S. W. Robinson's entry was part of 120 acres of clean fallowed land. Although stated to be four inches, actually the depth of ploughing varied. This was also the case with Mr. C. E. Lehman's entry. Here, also, the weeds appeared to have been dealt with in a satisfactory manner.

Except for "prickly summer weed," Mr. J. Lindsay's fallow was comparatively free of weed growth. Sheep had been pastured on this land subsequent to the September cultivation. This practice, so often adopted by the leading farmers of the State, is no doubt responsible for the absence of weeds on many fallows throughout the Wheat Belt. A few roots were noticed on the surface of this particular fallow, which could to advantage have been ploughed to a more even depth.

The surface of Mr. J. Bowle's fallow was ridged and lumpy in places. On the lighter portions, the ploughing had been deeper than on the heavier. In the sandier portions of the fallow moisture was still visible close to the surface. Weeds, including Cockspurs and Capeweed, were noticed over this fallow.

The initial ploughing of Mr. L. Hall's fallow had been done thoroughly, except on odd hard patches. It is to be regretted that this fallow did not receive more subsequent cultivation. On certain portions the surface presented a very lumpy appearance. Improvement would also have been effected by picking up the few roots brought up by the plough.

A later cultivation would have produced a much better fallow entered by Mr. H. Hodgson. The subsequent rain had, to a large extent, destroyed the mulch. A small portion which had received an extra cultivation, demonstrated the benefit which would have resulted if the whole had been treated in the same manner.

The entry of Mr. N. McKay was fallow on mixed salmon, gimlet, ti-tree and scrub country. It was ploughed at the end of August to a depth of three inches with a disc plough. Early in September this was then skim ploughed back and left. Sheep were pastured on the fallow to keep down weed growth. The result was that when judged, the fallow presented little or no mulch The September rains had beaten down the surface and the sheep running along the wheel marks left by the plough had not improved matters. This fallow was, however, very clean of weeds and roots. Cultivation subsequent to the second ploughing would have effected a great improvement.

JUNIOR FIELD TRIALS, 1927.

MERREDIN EXPERIMENT FARM.

E. J. LIMBOURN.

Wheat.

This experiment, which is planted with a seed-drill, was located with the other Field Experiments in the main cropping paddock. The details relative to the method of conducting this Experiment were published in this Journal in March, 1927.

The experiment was planted on May 27th, the ground being in excellent condition, at the time, excepting that sufficient moisture was lacking for a ready germination. Rain did not fall until early in June, no plants showing up until June 16th. Germination throughout was very good.

During the growing period the rains were light but fairly regular, keeping the plants growing steadily all the time. Leaf rust was much in evidence on all varieties. With the September rains, stem rust showed up, the late varieties were, however, the only ones affected by it, and it is possibly due to this that their grain yields were low. It will be noticed that in all of the late varieties the comparative hay yield is very much higher than the comparative grain yield.

The results show again that varieties maturing later than "Nabawa," our standard mid-season variety, are not suitable for heavy soils with a light rainfall.

The experiment included 25 varieties, with Gluyas Early as the control variety.

Of these, 11 were varieties received from the Eastern States, all, with the exception of "Bena" having given good results in the Test Rows. "Bena" was again included, on account of exceptionally good results published from the Eastern States. This is the third year it has been included, 1925 being the only year with satisfactory results. 1925 was a year with very low winter rains and an exceptionally dry August, followed by good spring rains in September and October. Early varieties that year had been forced to maturity too early, resulting in low yields, later varieties benefiting by this and the later rains. It is quite evident that no abnormal yields can be expected from "Bena" or any late maturing variety under our conditions. During the 3 years this variety has been tried the percentage yields of grain have been:—1925, 94; 1926, 63; 1927, 53. Average, 70. The remainder of the varieties under test (14) were un-named crossbreds from the Chapman and Merredin Experiment Farms. Nine of the Merredin crossbreds (Nos. M23 to M32) are still under selection in the Test Rows being included in the Field Trial as a test of their probable yielding capacity. It will be noticed that with the exception of M27, they have all given fairly satisfactory results, ranging from 88 per cent. to 98 per cent. of the Control variety for grain yield. This, in conjunction with their high resistance to disease, gives every promise of some useful varieties, suitable to W.A. conditions, being obtained. Of the older crossbreds, M14 to M21 and C49, only the two very early maturing varieties M14 and M18 are worth testing further at Merredin. M21 would no doubt be useful as a hay variety, but it is doubtful if there is sufficient need for a purely hay variety. Its quality is not exceptionally good, height and weight being its chief characteristics. C49 evidently requires a better rainfall.

Herewith a few brief notes on the characteristics of varieties from the Eastern States :—

*Bena, P*1614 (*N.S.W.*).—Quite unsuited to conditions in the lighter rainfall districts. Owing to the general lack of good spring rains it is doubtful if satisfactory yields would be obtained over a number of years in any portion of our wheat belt. It is very susceptible to most diseases, Bunt, Flag Smut, Rust and the take-all diseases having all been found. Maturity Late midseason, early growth slow and spreading.

Bunge No. 1 *x Emmer, P*1451.—This is a Queensland crossbred, unnamed, with a remarkable capacity for stooling. The ear is, however very small, which probably accounts for its low yield.

Although fairly short in the straw (40in.) its hay yield was slightly better, due to abnormal stooling. In quality of hay it is poor.

Its usefulness lies in its possibilities for crossbreeding, which it is intended to test as early as possible. Maturity, very early.

*Confederation, P.*1696 (*Victoria*).—A medium short-strawed variety, requiring a moderate to good rainfall.

Very susceptible to Bunt, but shows marked resistance to Flag Smut. Slightly affected by rust this season. Maturity, Late.

*Ghurka, P*1713 (*Victoria*).—Although yields this season were low this is certainly the best of the newer varieties from Victoria. Being short strawed it should stand up to windy conditions at harvest time, and shows no liability to shed its grain.

It is fairly resistant to disease, the tests with Bunt and Flag Smut being very satisfactory. Rust was noticed on the straw but the grain did not appear to be affected to any great extent. It apparently requires a fairly good rainfall and is not recommended for heavy soil where the rainfall is light. Maturity, Late.

*Mogul, P*1703 (*Victoria*).—A medium short strawed variety, that evidently requires a good rainfall. Results under field conditions here are very unsatisfactory, giving the lowest yield for both grain and hay.

It was rather badly infested with rust and gives very low resistance to both Bunt and Flag Smut. Maturity, Late.

*Parsee, P*1701 (*Victoria*).—A fairly good late hay variety of good colour and height. Grain yield badly affected by rust, and lack of spring rains.

Very susceptible to Bunt and Flag Smut. Maturity, Late.

*Patriot. P*1463 (*Queensland*).—This variety has given very satisfactory results both for grain and hay. The grain is of good quality, hay of good colour and height. It is very susceptible to Bunt, but was very clean from rust this season. Has not been tested for Flag Smut. Maturity, Early.

*Rajah, P*1710 (*Victoria*).—A very showy variety, stools well, but failed to yield up to expectation. Grain somewhat affected by rust, and of very poor quality.

It is fairly resistant to Flag Smut but susceptible to Bunt.

It has been tested for two years, but has yielded below 80 per cent. of the control variety Gluyas Early on both occasions. It is evidently not suited to our conditions, heavy soil and low rainfall. Maturity, Midseason.

*Rannee, P*1697 (*Victoria*).—A medium short straw variety. Has given distinctly better results than Rajah, but is rather more susceptible to disease, Bunt, Flag Smut and Rust. Maturity, Midseason.

*Sterling P*1712 (*Victoria*).—Its comparatively high yield of hay combined with its medium height, suggests that it has great possibilties for grain under suitable conditions. Rust and late maturity, greatly affected its grain

yield here this season, and it cannot be recommended for any of the light or moderate rainfall districts.

It is very susceptible to both Bunt and Flag Smut. Maturity, Late.

*Waratah, P*1627 (*N.S.W.*).—This has again given very satisfactory results, both for hay and grain. It stands very well against rough winds, but may be inclined to shed a little of its grain.

It is unfortunately very susceptible to both Bunt and Flag Smut, and was slightly affected by the rust attack this season. Maturity, Midseason.

The sections intended for hay were reaped by hand and weighed when cut and also after curing. The weights shown in the tables are those obtained after curing. The percentage yield given is the actual dry yield calculated as a percentage of the average yield of the two control varieties between which the other varieties were grown. The yields obtained are as follow :—

JUNIOR FIELD TRIALS, 1927—WHEAT VARIETIES.

MERREDIN EXPERIMENT FARM.

HAY YIELDS.

Weight of Sheaves after curing in Paddock.

Name.	Reg. No.	Section C.		Section E.		Section I.		Average percentage Yield.
		Actual Yield.	Comparative Yield.	Actual Yield.	Comparative Yield.	Actual Yield.	Comparative Yield.	
		lbs.	%	lbs.	%	lbs.	%	
Gluyas Early	P 159	11·50	100	12·25	100	11·50	100	100
Mogul	P1703	8·50	85	9·25	79	7·50	75	80
Sterling	P 1712	11·00	110	11·75	101	10·25	102	104
Ghurka	P 1713	8·25	82	8·75	75	8·25	82	80
Confederation	P 1696	9·50	95	12·00	103	10·00	100	99
Parsee	P 1701	10·25	102	11·00	95	9·50	95	97
Gluyas Early	P 159	9·50	100	11·00	100	9·50	100	100
Gluyas Early	P 159	10·50	100	12·00	100	9·50	100	100
Rajah	P 1710	9·00	81	8·75	77	8·50	86	81
Ranee	P 1697	9·00	81	10·00	87	7·50	76	81
Waratah	P 1627	11·00	100	11·25	98	10·00	100	99
Bena	P 1614	8·75	80	9·50	83	8·50	86	83
(Fortune × Gluyas E.)	C 49	9·25	83	10·00	87	9·25	93	88
Gluyas Early	P 159	11·50	100	11·00	100	10·25	100	100
Gluyas Early	P 159	10·00	100	9·50	100	10·00	100	100
Patriot	P 1463	9·00	91	10·00	98	8·75	89	93
(Dindiloa × Nabawa) ...	M 28	8·25	84	8·00	79	8·50	86	83
(Nabawa × Carrabin) ...	M 27	8·00	81	7·75	78	8·00	81	80
(Florence × Fortune) ...	M 32	8·50	86	9·00	88	8·75	88	87
(Gluyas Early × Nabawa)	M 31	9·50	93	9·75	95	8·50	86	93
Gluyas Early	P 159	9·75	100	11·00	100	9·75	100	100
Gluyas Early	P 159	9·50	100	10·50	100	9·25	100	100
(Dindiloa × Nabawa) ...	M 30	9·25	88	11·00	103	9·50	99	97
(Dindiloa × Nabawa) ...	M 29	9·50	90	10·00	94	8·75	91	92
(Nabawa × Carrabin) ...	M 25	9·50	90	8·25	78	8·75	91	86
(Florence × Carrabin) ...	M 24	8·50	81	9·25	87	7·75	80	83
(Federation × Carrabin)	M 23	9·75	93	10·00	94	9·50	99	95
Gluyas Early	P 159	11·50	100	10·75	100	10·00	100	100
Gluyas Early	P 159	10·00	100	10·00	100	9·25	100	100
Selection from Federation	M 21	10·00	96	11·00	101	10·00	105	101
(Nabawa × Sunset) ...	M 19	8·50	82	8·75	80	7·25	78	80
(Federation × Bunyip)...	M 18	8·00	77	9·00	83	6·75	71	77
(Nabawa × Bunyip) ...	M 14	7·75	75	9·00	83	7·50	79	79
Bunge No. 1 × Emmer...	P 1451	10·00	96	11·00	101	9·75	105	101
Gluyas Early	P 159	10·75	100	11·75	100	9·75	100	100

The grain sections were harvested by hand and the sheaves threshed with the small machine thresher, care being taken to get the results as accurate as possible. After threshing, the grain from each variety was carefully weighed to the nearest eighth of an ounce, each section being weighed separately. From these weights the percentage yield of each variety was

calculated, using the average yield of the two control plots to calculate that of each of the five varieties tested between each two controls. The yields obtained are as follow :—

JUNIOR FIELD TRIALS, 1927—WHEAT VARIETIES.

GRAIN YIELDS.

Name.	Reg. No.	Sectional Grain Yields.					Average.	Comparative.
		B.	D.	F.	H.	J.		
		ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	%
Gluyas Early	P 159	48·375	40·250	48·875	48·500	48·625	46·925	100
Mogul	P 1703	17·875	17·000	18·625	18·125	20·125	18·350	41
Sterling	P 1712	29·125	28·250	28·875	29·125	34·625	32·000	72
Ghurka	P.1713	29·125	...	27·750	31·625	35·125	30·906	70
Confederation	P 1696	28·125	28·000	32·125	30·375	33·250	30·375	68
Parsee	P 1701	24·750	25·750	30·750	28·375	30·750	28·075	63
Gluyas Early	P 159	34·250	40·000	43·500	45·750	46·250	41·950	100
Gluyas Early	P 159	36·500	36·625	44·875	43·375	45·125	41·300	100
Rajah (Vic.)	P 1710	30·500	30·000	34·250	32·500	34·625	32·375	76
Ranee	P 1697	30·875	36·375	37·500	37·250	34·750	35·350	83
Waratah	P 1627	34·625	36·250	40·250	37·000	45·625	38·750	91
Bena	P 1614	18·375	22·125	26·125	23·750	21·750	22·425	53
(Fortune × Gluyas Early)	C 49	27·750	29·875	34·625	30·500	32·750	31·100	73
Gluyas Early	P 159	42·250	36·375	47·750	43·250	49·000	43·725	100
Gluyas Early	P 159	35·875	37·000	42·750	46·000	43·500	41·025	100
Patriot	P 1463	31·750	37·875	43·125	41·250	45·375	39·875	98
(Dindiloa × Nabawa) ...	M 28	31·875	39·125	40·750	40·500	45·875	39·625	97
(Nabawa × Carrabin) ...	M 27	26·000	24·500	27·250	28·000	31·375	27·625	68
(Florence × Fortune) ...	M 32	33·500	38·875	41·875	31·375	44·250	37·975	93
(Gluyas Early × Nabawa)	M 31	29·250	37·000	40·625	40·000	39·375	37·250	91
Gluyas Early	P 159	34·250	38·875	44·000	45·500	40·750	40·675	100
Gluyas Early	P 159	26·500	36·750	40·375	39·125	41·500	36·850	100
(Dindiloa × Nabawa) ...	M 30	27·750	35·750	38·375	36·000	41·125	35·800	91
(Dindiloa × Nabawa) ...	M 29	26·125	34·000	42·750	37·000	39·250	35·825	91
(Nabawa × Carrabin) ...	M 25	30·125	35·000	40·000	40·125	45·500	38·150	97
(Florence × Carrabin) ...	M 24	25·375	37·250	37·500	36·750	36·000	34·575	88
(Federation × Carrabin)	M 23	32·250	38·250	43·625	39·875	42·375	38·875	98
Gluyas Early	P 159	36·000	43·750	40·250	45·500	45·125	42·125	100
Gluyas Early	P 159	32·875	41·625	41·625	44·625	40·125	40·175	100
Selection from Federation	M 21	27·750	32·500	34·500	31·750	35·000	32·300	77
(Nabawa × Sunset) ...	M 19	23·250	26·375	31·125	31·000	29·625	28·275	67
(Federation × Bunyip)...	M 18	33·625	35·250	36·625	35·375	39·625	36·100	86
(Nabawa × Bunyip) ...	M 14	30·000	33·125	36·250	34·625	37·875	34·375	82
(Bunge No. 1 × Emmer)	P 1451	28·500	27·375	33·875	35·250	36·375	32·275	77
Gluyas Early	P 159	36·875	44·875	47·750	43·750	45·875	43·825	100

TABLE SHOWING THE RELATIVE YIELDS OF HAY AND GRAIN.

Name of Variety or Parent varieties of Crossbreds.	Reg. No.	Maturity.	Height, Inches.	Hay Yield.	Grain Yield.
Gluyas Early—Control	P 159	Early	45	100	100
Patriot	P 1963	Early	45	93	98
Waratah	P 1627	Mid.	43	99	91
Ranee	P 1697	Mid.	39	81	83
Bunge No. 1 × Emmer	P 1451	Very Early	40	101	77
Rajah	P 1710	Mid.	40	81	76
Sterling	P 1712	Late	43	104	72
Ghurka (Short Straw)	P 1713	Late	34	80	70
Confederation	P 1696	Late	39	99	68
Parsee	P 1701	Late	43	97	63
Bena	P 1614	Late	38	83	53
Mogul	P 1703	Late	40	80	41
(Federation × Carrabin)	M 23	Early	43	95	98
(Nabawa × Carrabin)	M 25	Early	45	86	97
(Dindiloa × Nabawa)	M 28	Early	43	83	97
(Florence × Fortune)	M 32	Early	44	87	93
(Dindiloa × Nabawa)	M 29	Early	42	92	91
(Dindiloa × Nabawa)	M 30	Early	42	97	91
(Gluyas Early × Nabawa)	M 31	Mid.	45	93	91
(Florence × Carrabin)	M 24	Early	44	83	88
(Federation + Bunyip)	M 18	Very Early	38	77	86
(Nabawa × Bunyip)	M 14	Very Early	45	79	82
A selection from Federation	M 21	Early	47	101	77
(Fortune × Gluyas Early)	C 49	Mid.	41	88	73
(Nabawa × Carrabin)	M 27	Late	41	80	68
(Nabawa × Sunset)	M 19	Mid.	45	80	67

Oat Varieties.

The results of this experiment are rather more satisfactory for 1927 than in the previous season, the effect of weed growth having been to a great extent overcome.

The Oat varieties were planted alongside the wheat section of the Trials, but were drilled in on May 4th, about three weeks earlier. The Oat section therefore lacked the extra cultivation given to the Wheat, and which practically cleared the Wheat portion of Barley grass.

Owing to lack of moisture, germination was very patchy. At the time of planting there appeared to be ample moisture to germinate the grain readily, and it was probably due to the absence of rain after planting that germination only took place where the soil was free from clods.

Although irregular, the final germination was good, the majority of the seed not germinating until after the rains early in June.

The effect of the irregular germination, combined with the disadvantage of weed growth, could be noticed right throughout the growth of the plants. Sections B D and G, having the greater amount of weeds, were affected most, growth being shorter, maturity nearly two days later, and yields generally considerably below the other sections. The greatest variation in maturity was found in the depressions where the weed growth was greatest.

The control variety, "Burt's Early," did not yield as well as usual, either for hay or grain, and most of the varieties under test compare very well with it. Quite a lot of its grain was shed before being harvested, although it was not left standing more than two days after it matured.

Mulga, the variety that has given the most satisfactory results for several seasons in the main variety trial, was included as a further means of comparison.

Hereunder are brief notes on the new varieties under test:—

*Buddah, P*1632 (*N.S.W.*).—A selection from Sunrise Oats by Mr. J. T. Pridham, of Cowra, N.S.W.

An early maturing variety, should prove a good oat for silage purposes, making good tall growth, and is very succulent. Does not break down as easily as Sunrise, gives a good yield of grain, pale yellow in colour, and as plump as "Mulga." A decided improvement on "Sunrise" variety.

Has been very free from disease on each occasion.

Palestine, P 1716.—A very short-strawed variety received from Werribee Research Farm, "Victoria."

Purely a grain variety, although it might prove useful for early feed. It is very quick growing, with a very strong young growth. Matures even earlier than "Burts Early."

Forms two grains of equal size, each having an awn. In well matured ears a smaller third grain forms. Grains long and medium plump, with very harsh hulls, brown in colour. It is inclined to shed its grain a little. Rather liable to disease.

*Gidgee, P*1737 (N.S.W.).—Received from Mr. Pridham in 1926. This is the name given to the N.S.W. selection called Glen Innes No. 8. It will be noticed that our selected grain P1470 is a decidedly better yielder. There is no difference in type between the two strains. This will in future be called "Gidgee, N.S.W."

Glen Innes No. 8, *P*1470 (N.S.W.).—This variety has been under observation and selection for several years in the Test Rows. It is a variety very similar in type to "Guyra," but matures about seven days earlier.

The straw has the same purple colour, and the grain is also dark brown in colour. It has a rather coarse awn which, however, threshes off quite easily.

Being earlier maturing, it may prove to be an improvement on "Guyra," and from the results of the Trial this season it is evidently a heavy yielder, whether grown for hay or grain.

It will in future be called "Gidgee, W.A.," the new strain received under that name being discarded as inferior.

*Belar, P*1740 (*N.S.W.*).—This is a new strain of Glen Innes No. 5 Oats, received from Mr. J. T. Pridham in 1926. It proves to be quite distinct from the original strain received a few years earlier, No. 1412. It is rather later than Mulga Oats and does not mature too well on heavy soil.

Its yields, however, were very satisfactory, and it should prove a useful oat for lighter soils.

Fairly tall growth, stands well, and does not shed its grain. Grain pale yellow in colour, probably fairly plump when fully matured.

Glen Innes No. 6, *P*1410 (*N.S.W.*).—A short-strawed, fairly early variety, received under the name of "Belar," P1740. Late maturing, medium length straw, grain white. When harvested the grain proved to be very immature, although from its appearance it should be fairly plump when fully matured.

Glen Innes No. 6, *P*1410 (N.S.W.).—A short-strawed, fairly early variety very prolific. It lodged badly after rain when mature, and for that reason it will be discarded.

Grain white, medium plump, and matures well.

*College Algerian, P*1783—This variety was received early in 1927 from Tasmania. It is evidently a late maturing strain of Algerian, being quite similar in type to that variety. It is a very prolific strain, but too late for our conditions. The grain when harvested was very immature, and the resulting yield light.

(*Algerian* x *Skinless*) *M*22.—This is the result of selection from a natural crossbred found in Algerian Oats in the Test Rows at this farm. It is a Skinless or Hull-less type of oat—Avena Nuda—the grain of which threshes clear of the husk. It is slightly earlier maturing than Algerian, with fair size grain. Its hay yield compares very well with other varieties, but a large proportion of the grain is lost when threshing, being small and light without the husks.

It is doubtful if it would be a profitable type to grow except for household use or as a feed oat for private use.

The yields are as hereunder :—

MERREDIN EXPERIMENT FARM.

JUNIOR FIELD TRIALS, 1927—OAT VARIETIES.

HAY YIELDS.

Weight of Sheaves after curing in the Paddock.

Name.	Reg. No.	Average height when cut.	Section C.		Section E.		Section I.		Average.	
			Actual Yield.	Comparative Yield.	Actual Yield.	Comparative Yield.	Actual Yield.	Comparative Yield.	Actual Yield.	Comparative Yield.
		inches.	lbs.	%	lbs.	%	lbs.	%	lbs.	%
Burt's Early	P1494	50	8·50	100	6·75	100	7·25	100	7·50	100
Buddah	P1632	55	10·00	111	7·75	101	8·25	86	8·67	101
Palestine	P1716	38	8·75	97	6·00	79	6·50	68	7·08	82
Mulga	P1185	53	10·00	111	8·00	105	9·00	93	9·00	104
Gidgee	P1737	50	10·75	119	8·75	115	9·75	101	9·75	113
Glen Innes, No. 8 ...	P1470	50	10·75	119	8·25	108	11·25	117	10·08	117
Burt's Early	P1494	48	·50	100	8·50	100	11·25	100	9·75	100
Burt's Early	P1494	48	9·75	100	7·50	100	9·00	100	8·75	100
Belar	P1740	44	10·50	106	9·50	107	11·00	124	10·33	111
Glen Innes, No. 5 ...	P1412	38	9·50	96	8·00	90	10·00	113	9·17	99
(Algerian × Skinless) ...	M22	45	11·00	111	10·00	113	10·50	118	10·50	113
College Algerian	P1783	42	10·25	104	8·75	99	11·25	127	10·08	109
Glen Innes, No. 6 ...	P1410	47	9·00	91	10·25	115	9·25	104	9·50	102
Burt's Early	P1494	48	10·50	100	10·25	100	8·75	100	9·83	100

GRAIN YIELDS.

Name.	Reg. No.	Average height.	Sectional Grain Yields.					Average Yield.	Comparative Yield.
			B.	D.	F.	G.	J.		
		inches.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	%
Burt's Early	P 1494	47	31·125	25·000	31·500	30·500	44·500	32·525	100
Buddah	P 1632	50	40·500	40·875	49·875	53·375	49·875	48·900	138
Palestine	P 1716	40	47·875	37·375	44·625	45·875	48·500	44·850	126
Mulga	P 1185	50	43·875	41·625	45·500	51·000	59·750	48·350	136
Gidgee (N.S.W.) ...	P 1737	48	44·000	31·750	49·125	49·000	56·000	45·975	129
Glen Innes, No. 8 ...	P 1470	48	47·875	41·000	53·500	54·250	51·500	49·625	140
Burt's Early	P 1494	47	27·375	29·750	44·625	43·875	47·625	38·650	100
Burt's Early	P 1494	47	31·625	27·000	30·125	38·375	43·125	34·050	100
Belar	P 1740	49	41·250	38·500	46·500	48·750	51·250	45·250	122
Glen Innes, No. 5 ...	P 1412	38	39·750	28·750	34·375	40·000	45·750	37·725	102
(Algerian × Skinless) ...	M 22	45	34·625	29·000	33·250	43·500	45·750	37·225	101
College Algerian ...	P 1783	42	31·500	24·250	34·000	34·750	38·500	32·600	88
Glen Innes, No. 6 ...	P 1410	46	46·750	36·750	49·500	65·000	55·250	50·650	137
Burt's Early	P 1494	47	34·625	33·250	36·000	52·750	43·125	39·950	100

MERREDIN EXPERIMENT FARM.

JUNIOR FIELD TRIAL, 1927—OAT VARIETIES.

Varieties arranged in order of Yield of Hay, with Grain Yields given for comparison.

Name of Variety.	Reg. No.	Hay.	Grain.
Glen Innes, No. 8	P 1470	117	140
Gidgee (New South Wales)	P 1737	113	129
Algerian × Skinless)—Huskless type of grain	M 22	113	101
Belar (rather late maturing)	P 1740	111	122
College Algerian (very late)	P 1783	109	88
Mulga	P 1185	104	136
Glen Innes, No. 6 (short straw)	P 1410	102	137
Buddah	P 1632	101	138
Burt's Early (Control)	P 1494	100	100
Glen Innes, No. 5 (short straw, late maturing)	P 1412	99	102
Palestine (very short straw)	P 1716	82	126

HORTICULTURAL NOTES.

GEO. W. WICKENS,
Superintendent of Horticulture.

Seasonal Work for April, May and June.

APRIL.

April is usually the month in which apple growers of Western Australia are busy picking and packing for export, but this year there will be less forwarded to European markets in April than for many years past. At time of writing—1/3/28—only two boats have been booked, one on the 10th and one on the 16th, and combined loadings on these only amount to 6,000 cases. But though the crop has been light, the work connected with harvesting is the only item in the round of orchard duties which is less on that account.

Fertilisers must be applied, and this is the best month for making the general application in all deciduous orchards: 6 cwts. of Superphosphate, 2 to 3 cwts. of Muriate or Sulphate of Potash per acre, with 1½ bushels of peas sown in April and ploughed under in spring will keep all trees in good heart and will enable the apple trees to bring the heavy crop of fruit which may reasonably be expected next season to a marketable size.

Where citrus orchards are being treated use half the super and half the potash mentioned above, and apply the remainder in spring.

If for any reason peas cannot be grown satisfactorily, use 2 to 3 cwts. of Sulphate of Ammonia or Nitrate of Soda; apply same in spring whether the orchard to be fertilised is citrus or deciduous.

In orchards where Citrus Brown Rot was experienced last season citrus trees should be sprayed to a height of four to five feet from the ground, together with the land under, and extending for a foot or more outside the spread of the branches. Use Bordeaux at a strength of 4 lbs. bluestone, 4 lbs. freshly burned lime to 50 gallons of water; or Burgundy at a strength of 4 lbs. bluestone, 6 lbs. washing soda, 50 gallons of water. The trees should not be sprayed all over, or the beneficial fungi which attack lecanium scales will be destroyed, and these pests will increase with great rapidity.

In districts where fruit fly exists every care should be taken to collect all second crop deciduous fruits which, owing to having no commercial value, are often allowed to remain on the trees, become infested and carry on the pest to the orange crop. All fallen fruits should be collected, and those of no value destroyed by boiling.

Those orchardists fortunate enough to have a crop of "Granny Smith" apples this season are strongly advised to use prepared oiled wraps as wrapping paper before placing the fruit in cold storage. Tests made by the Department have proved that wrapping the variety named as advised will practically eliminate all danger of scald.

MAY.

Pruning will now claim the attention of growers of stone fruits, particularly in the early districts near Perth, where most varieties of apricots, plums and peaches will have shed their foliage. Where varieties of peaches liable to shed their buds ("Briggs," "Hales," "Downing," "Alexander," etc.) are grown, it is advisable to delay pruning until the buds have burst in early spring.

Spray deciduous orchards for the control of San José Scale as soon as the leaves have fallen, using commercial lime sulphur at a strength of one gallon in seven gallons of water, or a reliable brand of spraying oil may be substituted for lime sulphur, using one gallon of oil in 19 gallons of water. To keep San José Scale in check it is necessary to spray twice while the trees are dormant: the first to be applied as early as possible after the leaves have fallen, and the second towards the end of winter in late August. As August is often a very wet month, care should be exercised in making the May spraying a very thorough one.

Where orange and lemon trees in affected orchards were not treated for Brown Rot last month they should be sprayed during the early part of this month, using Bordeaux or Burgundy as advised in April notes. In tests made both by this Department and individual growers it has been shown that one spraying in April or early May is sometimes sufficient to control the disease for the remainder of the season, but should the season prove favourable for the fungus, the trees should receive a further spraying when signs of infection appear. Later sprayings have the effect of spotting the fruit, but it is better to remove spray spots from sound fruits at time of picking than to have the crop destroyed by disease.

With the advent of wet weather, baiting operations for fruit fly are largely ineffective, but trapping in orange and lemon groves should be continued throughout the winter months.

JUNE.

Pruning of all deciduous trees should be pushed on with during this month.

Planting may be undertaken wherever the soil is not too wet and sticky.

Young plants, when received from the nursery, should be heeled in carefully so as to prevent the roots from drying out. To do this effectively the bundles of ten, in which the nurserymen usually tie up the trees, should be opened and each tree placed separately in the soil. If this is done as soon as the trees arrive, no harm will result if the planting has to be postponed for some weeks in the months of June or July.

The notes on planting for this month refer to deciduous trees only. Citrus trees give best results if planted at the latter end of August or early in September.

Any San José Scale infested orchards which have not received the first spraying mentioned in notes for May should be treated as early as possible this month.

Citrus growers should examine cracked oranges for signs of fruit fly, and destroy any found to be infested.

The orange export season commences this month, and this opportunity is taken again to stress the importance of handling the fruit most carefully when gathering, packing and loading. Bruised fruit and fruit with skin abrasions caused by finger nails will develop moulds and arrive in an unsaleable condition, a loss directly to the sender to the extent of the affected fruit, and indirectly and probably a much greater loss in bearing down the price of sound fruit offering on the same market.

THE VALUE OF THE CERTIFIED SEED POTATO SCHEME.

W. E. COLLINS,
Potato Inspector.

For the year 1926-27 it was estimated that 5,144 acres of potatoes were planted. The yield from this 5,144 acres (17,753 tons, or 3.45 tons per acre) was determined to a very large extent when the seed was selected. On the quality of the "sets" planted, much of the success of the potato crop depends. It may reasonably be assumed that this percentage (the highest in the Commonwealth) was to some extent due to the method of seed selection, as adopted by the more progressive growers, and to the use of seed under the Certified Seed Scheme.

For the benefit of growers not familiar with the Certified Seed Scheme particulars are given herewith:—

The first step to be taken under the Scheme is for the grower to make application for inspection of that portion of his crop which promises well for seed purposes. The area must be clearly pegged out and proper attention to "rogueing" carried out by the grower during the growing period to ensure seed true to name. After, say, three close inspections during growth the Inspector is present during bagging, and if satisfied of the cleanness and trueness to type of the tubers, the bags are sewn in his presence, and marked and transferred to the grower's shed, where the final inspection and grading into new bags, bearing the name and address of the grower takes place. Should the tubers still conform to the requirements of the Scheme as to grade and freedom from disease, the bags are double sewn and the certificate sealed on to the ends of the twine. No certificate is furnished unless the crop inspected, taking into consideration character of the season, yields well.

Only tubers above 3ozs. in weight are permissible under this Scheme, as large seed (for cutting) only is considerable desirable.

The register of the growers under this Scheme is kept by the Potato Branch, so that all inquiries for first class seed may be referred to the officers of the Branch.

The tag or label to be attached to each bag has set out on the front of it the grower's name and address, the variety and grade of the tuber, the signature of the Inspector, and the date on which the produce was inspected. On the back of this label are set out the conditions of the granting of the certificate.

The charge for the services of the Inspector is 3d. per bag. Where no certification follows no charge, of course, will be made.

Applications to come under this Scheme will not be dealt with until the crop is sufficiently forward to form a reasonable idea of its ultimate yield.

It is only during the past few years that growers have recognised that the value of seed potatoes cannot be determined merely by the inspection of potatoes after they have been harvested and offered for sale. While this method of inspection is better than none, it comes very far from helping the industry to obtain really good seed. What is required is that each grower should select, when digging, his very best roots, and reserve them for a special seed plot in the following season. These should be grown quite separately from his commercial crop, and given his utmost attention, during the period of growth, in the matter of eradicating all weakly and abnormal plants. By adopting this method, a system of continual selection would be carried out, and the progeny from undesirable and diseased seed would be eliminated—so bringing his seed to a very high standard.

These plots should come under the inspection and advice of the officers of the Potato Branch, who are ever ready to advise and assist in this direction, for the betterment of the industry generally. If the grower has doubts about the quality of his present holding of seed, certified seed can be highly recommended for his seed plot. Intending purchasers can be put into touch with growers of this seed on application to the Senior Potato Inspector.

Practically all experiments connected with the selection of seed potatoes from the best plants in a plot have shown that yields can be greatly increased through the use of such selected plants. Reports from numerous growers, in a number of cases, state that certified seed gave double the yield of ordinary seed. The value of this inspection work as carried out by the officers of the Potato Branch is being recognised and appreciated more and more every year as larger quantities of such seed become available, and a greater number of growers take advantage of the information to be gained from having their plots inspected.

Even if a grower does not wish to specialise in the sale of Certified Seed, the benefit to be derived through an inspection of his plots, in order to improve the quality of his own seed and consequent yield of his main crop, is sufficient to make it worth while. It is very important to use good seed if the best results are to be secured. The seed should be from vigorous, productive plants, relatively free from disease, and true to type.

Without certification the grower who buys his seed from other localities, in most cases, has no way of knowing the character of the plants from which his seed was harvested. Neither has the grower any way of knowing the prevalence or otherwise of potato diseases on the seed producer's farm. Proper inspection and certification tends to reduce, not only the number of potatoes not true to type, but also many diseases such as Rhizoctonia, Common Scab, Mosaic, Curly Leaf, etc. Absolute freedom from all disease is well nigh impossible. The well-known diseases Rhizoctonia and Common Scab are found to a greater or less extent in most of our soils, and consequently are to be found affecting most of our potatoes. Since these diseases decrease the yield, the infection of seed stocks should be kept as low as possible.

Rhizoctonia and Common Scab can be almost entirely eliminated by the treatment of seed with a solution of corrosive sublimate, and if the grower is willing to go to the trouble of treating his seed, the presence of these two diseases should not prevent the use of seed so infected, if it is known to be

otherwise of high productive qualities. Mosaic, Leaf Roll, and Thready Eye are diseases which cannot be discovered through an inspection of the seed, but which nevertheless are carried with them, and such diseased seed will produce only diseased and unproductive plants. The only way, therefore, to prevent increasing outbreaks of these diseases is thorough inspection, whilst growing, of plots intended for seed purposes, and the rigorous "rogueing" or elimination of all infected plants before harvesting the crop.

Summary.

Growers should have their own seed plots, which should be grown quite apart from his general crop. It is a noteworthy fact that a grower does not like to "rogue" his general patch—but, the same man would not hesitate a moment in the pulling out of undesirables from his seed plot.

The Potato Branch will inspect, and advise in these particular plots.

"Dipping" the seed is of great importance. It minimises fungi and bacterial troubles.

SEEDS.

PEDIGREE DELAWARE SEED POTATOES

grown under the inspection of the Department of Agriculture. In new sealed bags, certified by the Department's Inspector.

ROUND AND LARGE DELAWARE SEED

inspected and dipped in Fungicide Solution, under the direction of the Department of Agriculture.

Seed Wheat and Oats, Barley, Rye.

Subterranean Clover, Field Peas, Paspalum, Rape, Lucerne, etc.

Prices and particulars obtainable from the Seed Department

THE WESTRALIAN FARMERS, LIMITED,
WELLINGTON STREET, PERTH.

4—4

1. Stem-tumours on young wood of Dunns apple.

BURR-KNOT AND STEM-TUMOUR OF APPLE AND QUINCE TREES.

W. M. Carne, F.L.S.,
Botanist and Plant Pathologist.

Quinces and some varieties of apple trees are subject to unsightly wart-like swellings on their branches and stems. These swellings can be roughly divided into two types—

1. *Burr-knot.*—Rough wart-like areas projecting up to about $\frac{3}{4}$ inch beyond the surface of the stem. The surface of the knots is covered with a compact mass of small rounded projections.

2. *Stem-tumour.*—The wart-like swellings are smooth on the younger growths but eventually become broken and rough on the surface. These tumours carry smaller swellings on their surfaces.

Burr-knots are found on quinces and some apples, particularly Northern Spy. They are formed laterally on the branches though several may fuse together to form a rough enlargement surrounding a branch.

Stem-tumours are usually developed in the same way as burr-knots. In the Dunns apple, however, they frequently originate in general club-like swellings of, rather than on the side of, the branches. They are particularly liable to develop on old spurs, where branches fork, and around dormant buds. In stem-tumours the small rounded projections may be noted on old broken tumours but they are scattered singly or in small aggregations over the tumour instead of occupying the whole surface as in burr-knots.

Examination of both types shows that they have their origin in the development of aerial or adventitious rootlets. These rootlets form the rounded projections on the rough surfaces. They are developed, make a little growth, become dormant and finally die. The annual production of new rootlets causes the knots and tumours to become larger until they form irregular swellings upwards of six inches in diameter.

If cuttings with knots or tumours are planted in moist ground in the spring they root readily.

On Northern Spy stocks it is common to find masses of fibrous roots developed near the ground level. These have their origin in burr-knots. Throwing up soil against the stems in the spring will induce a greater development of these hairy roots.

Though unsightly in appearance there is no evidence that the knots or tumours on the branches or the development of fibrous roots around the bases of Northern Spy stocks in any way affect the growth or cropping of the trees. It is probable that the bad effects sometimes attributed to the fibrous aerial roots on Northern Spy stocks are really due to unsuitable soil conditions for normal rooting which induce a greater development of the aerial roots.

2. Stem-tumours on old wood of Dunns apple.

The formation of burr-knots or stem-tumours is a varietal characteristic. Swingle, in the United States, after examining many varieties of apples, nearly 50 per cent. of which showed some tendency to knot or tumour formation, came to the conclusion that many varieties no longer grown commercially had been abandoned because of this tendency. Besides being unsightly these formations were formerly attributed to a bacterial disease known as Crown Gall, and particularly to that form of it known as Hairy Root. This opinion still has supporters in Australia in regard to the fibrous roots of Northern Spy. However, bacterial Hairy Root of any apple variety has been demonstrated in only very few cases in Australia and is probably rare.

The principal objection to the knots is that they form attractive harbourage for Woolly Aphis and Red Mite.

Summary.

1. The tendency to produce burr-knots or stem-tumours is a varietal characteristic of quinces and some varieties of apples.
2. The knots or tumours are associated with the development of dormant aerial rootlets.

3. Stem-tumour showing tips of dormant roots.

3. There is no evidence that burr-knots or stem-tumours have any detrimental effect on the growth or cropping of apple and quince trees.

References.

Brown, N. A.—An Apple Stem-tumour not Crown Gall. *Journal Agric. Research,* XXVII., 695, 1924.

Swingle, C. F.—Burr-knot of Apple Trees. *Journal Heredity* 16, 313, 1925.

Birmingham, W. A.—Burr-knot or Stem-tumour of Quince and Apple Trees. *Agric. Gaz., N.S.W.,* XXXVIII, 941, 1927.

4. Apple cutting rooting from stem-tumour. Planted in moist soil in August and photographed in December, 1927. Cutting divided for convenience in photographing.

WHEAT TRIALS AT KALGOORLIE.

H. RUDALL, Field Officer.

Demonstration wheat trial plots were again carried out last season at Kalgoorlie by the Municipal Council in co-operation with the Department of Agriculture.

The area of each plot was one acre in extent and consisted of the varieties "Noongaar," "S.H.J.," "Gluyas Early" and "Nabawa."

Cultural Notes.—The land was ploughed in July, 1926. Light harrows were used in September, 1926, and February, 1927. Owing to the light falls of rain from ploughing to February very little attention was given to the

Winnower and Chaff Heap, Kalgoorlie Demonstration Farm, 1927.

work until the heavy rains during March, totalling 503 points. Cultivation immediately took place with disc harrows, but owing to the compactness of the soil after such a fall, the harrows were hardly heavy enough to leave the whole of the block in a uniform mellow condition. A heavier implement would have done the work had it been available.

Seeding was completed on 3rd May. Rate of seed 40 to 45 lbs.; super 75 to 80 lbs. per acre.

The monthly rainfall during the fallow and growing period is shown hereunder:—

Monthly Rainfall.

From Date of Ploughing to Planting—

August, 11 points; September, 37 points; October, 11 points; November, 32 points; December, 35 points; January, 4 points;

February, 80 points; March, 503 points; April, *nil;* Total, 713 points.

After Planting—

May 9th, 24 points; May 16th, 11 points; total for May, 35 points. June 4th, 9 points; June 15th, 50 points; June 17th, 13 points; June 27th, 49 points; total for June, 121 points. July 2nd, 2 points; July 13th, 6 points; July 25th, 6 points; July 27th, 69 points; July 28th, 2 points; July 30th, 5 points; total for July, 90 points. August 8th, 29 points; August 23rd, 34 points; August 24th, 13 points; total for August, 76 points.

Rainfall during Growing Period.

May, 35 points; June, 121 points; July, 90 points; August, 76 points; Total, 322 points.

Harvested Grain. Kalgoorlie Demonstration Plots, 1927.

The average monthly rainfall recorded for Kalgoorlie is as follows:—

Rainfall Records for Kalgoorlie Zone.

31 Years (1896 to 1926).

January, 36 points; February, 68 points; March, 91 points; April, 88 points. Useful rains (May to October): May, 120 points; June, 116 points; July, 85 points; August, 87 points; September, 48 points; October, 64 points; total, May to October, 520 points. November, 55 points; December, 57 points. Total for year, 915 points.

The rainfall during the growing period to the end of August amounted to only 322 points, when most of the varieties were well headed and "Noongaar" was changing colour.

After the early varieties—"Noongaar," "S.H.J." and "Gluyas Early"—were well headed a further 168 points of rain were recorded during the month of September. The conditions which accompanied that rainfall helped to assist the production of the crop.

The acre yields obtained were:—

	bus.	lbs.
Noongaar	25	0
S.H.J.	18	0
Gluyas Early	15	0
Nabawa	9	30

The results of the latter variety, "Nabawa," cannot be used for comparative purposes with the others, owing to a strip of land in this plot consisting of much heavier clay soil than the remainder, and the disc harrows were not heavy enough to make the land as mellow as that portion from which the bulk of the yield from this variety was obtained.

The yields of the other varieties, and particularly "Noongaar," are excellent for the rainfall during the growing period, though it must not be forgotten that in March 503 points of rain were recorded, and this being stored in the fallowed land would be of benefit to the crops which were planted in April. This first yield of "Noongaar" shows it to be a variety of considerable promise as a drought resister.

Cotton Bush.
(*Asclepias fruticosa*, Linn.)

Explanation of Plate.

A.—Branchlet with flowers and fruits. B.—Leaf (nat. size). C.—Umbel of flowers (nat. size). D.—Flower. E.—Diagram of flower. F.—Fruit. G.—Seed.

COTTON BUSH.

(*Asclepias fruticosa*, Linn.)

W. M. CARNE, F.L.S., and C. A. GARDNER.

Cotton Bush is often known under the name of *Gomphocarpus fruticosus*. It is a shrub attaining a height of 4 to 8 feet, erect and slender in growth, and has a milky sap which exudes from cut or wounded parts.

Commonly grown as an ornamental shrub in gardens and parks, the plant has become naturalised in the Armadale district and in various parts of the South-West, principally along roadsides. Its habits of free seeding and rapid growth have made it an undesirable plant, particularly in orchard areas, but the plant is not to be regarded as a very serious weed. It was formerly a proclaimed noxious weed because it harboured the black scale (*Lecanium oleae*) a pest no longer serious in Western Australia, being controlled by parasitic insects.

The plant is native to South Africa, and was introduced into Western Australia at an early date. It may be easily recognised by its peculiar fruits which bear a fanciful resemblance to a duck or swan, and are filled with a silky white substance resembling kapok, but having no staple is useless commercially. Cotton Bush is known to some horticulturalists as "Swan Bush," and is often erroneously regarded as being native to North-Western Australia.

Description of Plant.—A shrub of 4 to 8 feet, erect and slender, the leaves narrow-lanceolate, bright green and shining above, acute, flowers white, in loose dropping umbels consisting of 3 to 10 flowers. Calyx-lobes small and narrow, corolla-lobes minutely fringed. Within the corolla is the corona, which consists of five pouch-like organs with their outer edges lower than the inner, the inner terminating in two incurved claw-like teeth. Fruits ovoid-acuminate, pale green, almost membranous, inflated, covered with soft prickles. Seeds with terminal tufts of silky hairs which open when the ripe seeds are liberated from the fruit, enabling the seeds to be wind-distributed. The number of floral parts varies from 4 to 5 in occasional plants. For further particulars see plate.

SHOT-HOLE BORER.

(*Xylion gibbicollis*)

Family: *Bostrychidae.*

L. J. NEWMAN, F.E.S.
Entomologist.

During the past two seasons, some anxiety has been experienced by vignerons owing to the discovery of the presence of a small boring beetle affecting the vine canes.

To determine the extent of the invasion and the damage caused, or likely to be caused, an investigation by the writer in conjunction with Mr. Johns, Viticulturist, has been made. Districts as far south as Katanning, and eastward to Northam and Toodyay, and the coastal plains vine country were visited. The beetle was found to be present in all areas inspected.

During the raking of our observations, we examined many native timbers surrounding the vineyards. It was proved that the same beetle was present.

The following timbers were collected and placed under incubation, and yielded the borer:—

York Gum, *Eucalyptus foecunda,* var. loxopheleba.
Manna Wattle, *Acacia microbotrya.*
Jam, *Acacia acuminata.*
Hakea glabella.

There is little doubt that other timbers are also affected. It is demonstrated that the beetle is widespread.

The *Bostrychidae,* to which this group of beetles belongs, are readily recognised by their curious cowled or hooded thorax, which is protruded over the head, the head being turned down beneath. The body is long compared to its width and cylindrical, being adapted for burrowing. The antennæ or feelers have the last three joints enlarged, forming a typical clavate or clubbed appendage. The larvae are short, thickset, fleshy, legless creatures, and live, feed and pupate within the tunnels which they make in the wood.

Xylion gibbicollis. Life history.

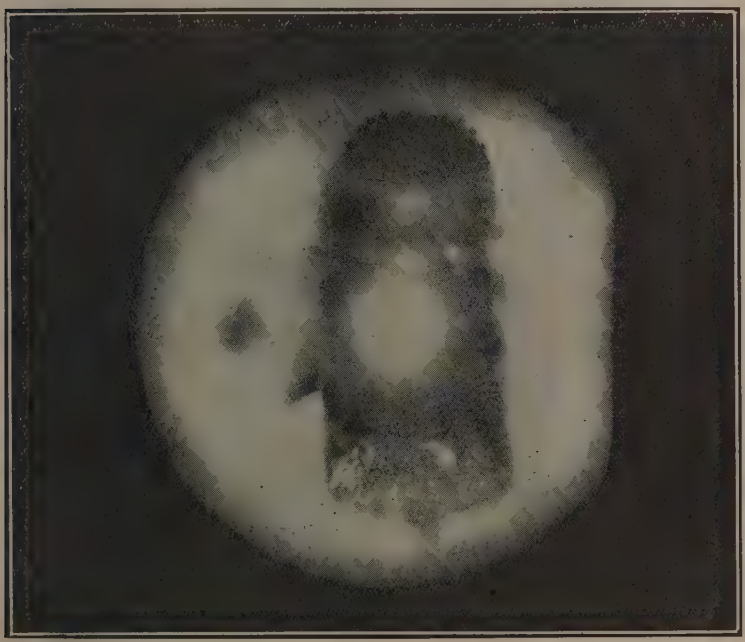
The Egg.—This is deposited in a small shot-hole made in the wood by the parent.

The Larvae.—This issues from the egg, is legless, thickset and fleshy. It feeds by tunnelling and finally pupates within its own gallery.

Pupa.—Naked, turning brown before the adult issues.

Imago or Adult.—A small cylindrical insect, varying in length from $\frac{1}{8}$in. to $\frac{1}{4}$in. The thorax is produced into a cowl or hood over the head. It is shiny black, deeply punctate and ornamented with a number of blunt

rounded, teeth-like projections. The eyes are somewhat prominent, the antennæ clubbed. The Elytra or wing covers enclose the whole of the abdominal portion of the body. They are hard and sharply truncated, giving the insect an abrupt sawn-off appearance. The colour of the Elytra is rusty red at the apex, gradually shading to black at the posterior or hind end. Like the thorax, they are deeply pitted with numerous small irregular depressions, giving the insect a generally rough appearance. The legs are reddish yellow.



I. Adult Beetle, viewed from above.

There appears to be two complete generations per annum in the vines.

Method of Attack.

The beetles and their larvae bore into the wood. The tunnels may be straight, or they may be in the form of a girdle.

From careful observation, it was noted that the girdling of the Cambium tissue was only done when there appeared to be an excess of sap. The girdling indicates that this borer prefers dead, dying or debilitated wood to work

in, hence the cutting off of the sap by means of the girdle. In no instance was the girdle found to be complete, there always being a small section of the Cambium left intact. *See* Illustration.

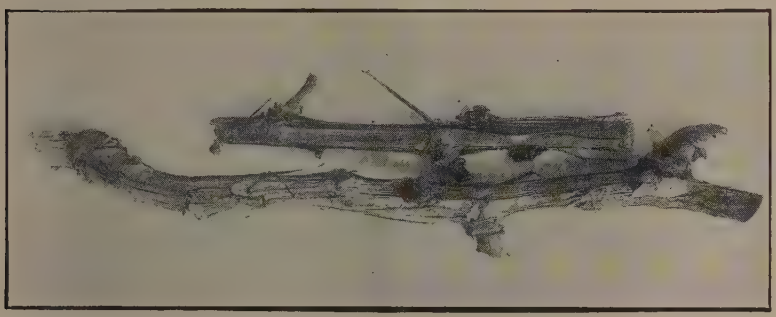
II. Section of Vine Cane showing typical girdle.

In examination of the infested vineyards, it was clearly demonstrated that vines which had become more or less weakened through lack of manure, or stressing for want of moisture, or over cinctured, were the ones to be infested. In a vine showing any vigour, the damage was found to be only temporary, the wound being gradually calloused over and completely healed.

One of the disadvantages following the girdling is the tendency of the canes to snap off when being tied down into position after pruning. Another result seen was the poorness of quality of the fruit.

An indication of attack is the exudation of gum.

Control.—The problem of control, even if a satisfactory form of insecticidal treatment could be evolved, is complicated by the fact that the borer possesses a large number of native host plants. This means that should it assume the status of a major vine pest, it will be a constantly recurring



III. Vine Canes showing typical gumming when attacked by Shot-hole Borer.

one, as it would re-establish itself in the vineyards from the adjacent infested bush lands. I do not, however, anticipate that this borer is going to be a serious vine pest, provided the vines are kept in a healthy vigorous condition.

The suggestion that an improved condition of growth should endow a plant with enhanced recuperative powers and, even in some cases, with a greater degree of resistance to attacks by pests is, I think, a reasonable one. This was borne out in all cases where the attack was made on a vine of any vigour. In every such instance, the wound healed over and the vine appeared none the worse. When, however, the vine attacked was weak, then the damage was serious.

The healing of the Shot-hole borer galleries is a natural phenomenon, which occurs in all vigorous growing plants. The healing is brought about by the formation of plant tissue, which entirely covers the gallery entrance and allows of the formation of normal wood outside. It is obvious, therefore, that in any measure of control against this borer, the healing process must be our main line of action.

The formation of new tissue over the wound can only be brought about by an adequate supply of plant food and moisture. The fact that vines which are stressing through drought are more readily attacked, indicates that the plant has lost its powers of healing and resistance and is, therefore, a suitable subject for the beetle.

Prevention and Treatment.

To meet the situation created by the presence of this borer in our vineyards, I submit that the matter of its control is only possible by keeping the vines in a good healthy growing condition. To accomplish this, they must be manured, well cultivated, and the moisture contents of the soil maintained.

Shallow land, which dries out in summer, should not be planted, because although the necessary manure may be applied, it will not be available to the plants owing to the lack of soil moisture.

Nitrogenous fertilisers promote good growth and would thus stimulate a healing process, and also render the wood of the vine unsuitable for the propagation of the pest.

If water can be applied to vines which have become droughted, much checking of the borer would take place.

As a protective measure against an early summer attack of the borer, I would advise the thorough spraying of the vines after pruning with the combined lime-sulphur and arsenate of lead mixture. To every 50 gallons of lime-sulphur mixture, add 2½lbs. of arsenate of lead. This will act as a protective coating against borers and also prove a useful fungicide. Apply this spray just before vines begin to break.

Note.—The arsenate of lead should be added to the lime-sulphur immediately before being applied. If allowed to stand together for any length of time, a chemical reaction takes place.

In pursuing the investigation, it was found that the borer was breeding very freely in the old vine prunings. It is very important, therefore, in any effort of control, to see that all vine or fruit tree prunings are destroyed by fire as soon as possible. By leaving such cuttings, countless numbers of beetles will be bred, which will have a natural affinity to vines or fruit trees.

In conclusion, I desire to state that I have no fear of this insect becoming a serious vine pest, provided vineyard sanitation, manuring, and cultivation are practised, thus keeping the vines in a vigorous resistant condition. Under conditions of neglect, it may prove a very serious factor.

ERRATUM.

In an article from the pen of the Director of Agriculture, entitled "Pertinent Topics," and appearing in the December issue of the Journal last year, part of the second line in the penultimate paragraph of the topic subtitled "Yandilla King and Rust," page 505, is made to read—" and to infection from the seed or soil." Obviously, this should be read "and *not* to infection from the seed or soil."—(Editor.)

PIG-RAISING IN WESTERN AUSTRALIA.

P. G. HAMPSHIRE,
Superintendent of Dairying.

Pig-raising in Western Australia may safely be said to be comparatively satisfactory in comparision with the ratio of pigs to dairy cows, as obtains on perusing statistics regarding the number of pigs and cows in the Commonwealth. In Western Australia, however, despite the fact that there is a greater ratio of pigs to cows, all that is possible is being done in regard to the development of this very important industry.

Dairy production in Western Australia has increased 150 per cent. during the last 10 years.

The State is provided with well equipped bacon factories, which are large enough and equipped with modern apparatus and well capable of treating far more pigs than are being received.

A considerable improvement is necessary here, as is probable elsewhere, in regard to a better type of average pig forwarded to the factories for manufacture into high class bacon. There is no doubt that one of the principal disabilites with which the bacon manufacturer has to contend is the curing of unsuitable pigs and making them into bacon. The question of suitable pigs is in the hands of the pig-raiser to a very great extent, assisted by proper facilities for transport to market quickly and efficiently.

Western Australia is well provided with pedigreed studs of pigs, where high class stock are bred and available for distribution throughout the State. The Government has studs of pigs at the Muresk Agricultural College, Narrogin School of Agriculture, Denmark Stud Farm, Hospital for Insane, Claremont, Wooroolloo Sanatorium, and is doing all in its power to provide—and advise the farmer in regard to the use of—pure high class boars for breeding good quality profitable market pigs.

The Department of Agriculture has urged upon every occasion the use only of pure bred, good type boars. The development of group settlements has greatly increased the pig production of the State.

The most popular breeds of pigs in Western Australia are :—Berkshire, Yorkshire, Tamworth. The other breeds of pigs, such as Large Black, Poland-China, Gloucester Old Spot, and Duroc-Jersey, are comparatively few in number.

The Berkshire stands out as being the most popular, and the Berkshire boar is the one generally used.

The Gloucester Old Spot breed was introduced into the State only a few years ago.

The class of pig that is being bred for marketing by the keenest and most practical pig-breeders is known as the Berkshire-Tamworth: Comeback. This pig is one of the most popular at the factories, and commands highest price.

In the southern (cooler) portion of the State the Berkshire-Yorkshire cross is also favoured.

In the feeding of pigs in Western Australia, separated milk, pollard, wheat, and pasture are the principal foodstuffs used.

Indicative of the development of the dairying industry in this State might be quoted the increased area laid down to permanent pasture during the last six years.—In 1921 the area of pasture was 17,000 acres, whereas in 1927 the estimated area was 125,000 acres.

The slogan adopted in the development of the pig-raising industry in this State is 1 brood sow to every 3 dairy cows.

Previous articles in the Journal have dealt with the "Breeding of Pigs for Market" and the "Selection and Management of the Herd Boar and Brood Sows." The subject of "Feeding Pigs" is of great importance to both feeders and breeders alike, and success or failure of the industry depends largely upon the methods employed.

Feeding Pigs.

The principal factors to remember in selecting feed in successful pig-feeding are :—

1. A pig has a comparatively small stomach. Its food must be rich and condensed or concentrated.

2. Foods such as milk, buttermilk, pollard, meat meal, peas, beans, lucerne, rape, clovers, cotton seed, linseed, and blood meal are proportionately rich in protein. The proteins are flesh formers, builders of bone, muscle, nerves, hair, hide, and hoof.

3. Foods such as maize, sorghum, barley, wheat, rye, and oats are proportionately rich in carbohydrates. The carbohydrates are the fat formers or energy producers.

4. Foods such as mixed pasture, green fodder crops, potatoes, artichokes, beet, mangels, apples, and vegetables supply increased appetites, variety, succulence, and palatability.

5. A complete ration is somewhat complex. Chemical analysis of foodstuffs guide us in the preparation of rations. Foods vary considerably, especially pastures. No one food is sufficient in itself, though some are nearly so The majority are deficient in some essential part to obtain best results. When feed contains unbalanced proportions of either protein or carbohydrates, animals are required to consume undue quantities of one principal constituent to obtain sufficient of the lacking foodstuff in the ration. This is waste of food, apart from the unnecessary work required to digest the surplus carbohydrate or protein.

To balance a ration is to mix foods in their right proportion, giving the right amount to obtain the maximum of result for the least expenditure. Balanced rations mean economical and high production meat and milk (or food conservation). Unbalanced rations mean expensive and low production (or food wastage). As an instance, herds of cows have been fed balanced rations with a certain milk production. The herds have been equally divided, everything being taken into consideration in obtaining equal division; one

half contained on the balanced ration, the other half of the herd given the same amount of food units but unbalanced, with marked reduction in milk (over 1 gallon per day per cow). When put back on the balanced ration the maximum production was resumed.

With pigs, take the experiment conducted at the Iowa Experiment Station by Professors Jno. W. Evvard : three lots of pigs aged 10 weeks, averaging practically 42lbs. each, were fed for 150 days as follows :—

Lot 1 received maize (as much as they liked), rock salt.

Lot 2 received maize (as 1), salt, plus bone material.

Lot 3 received maize (as 1 and 2), salt, plus meat meal (60 per cent. protein).

Lot 1, at 8 months, weighed 57½lb.

Lot 2, at 8 months, weighed 65lbs.

Lot 3, at 8 months, weighed 226lbs.

Lot 1 required 1,446 lbs. of corn to produce at the rate of 100lbs. of pork.

Lot 2 required 1,297lbs. of corn, plus 10 bone meal, 1lb. salt, to produce feed to produce at the rate of 100lbs. of pork.

Lot 3 required 366lbs. of corn. 47lbs, of meat meal and salt or 413lbs. of feed to produce at the rate of 100lbs .of pork.

Lot 1 consumed daily 1.56lbs. corn.

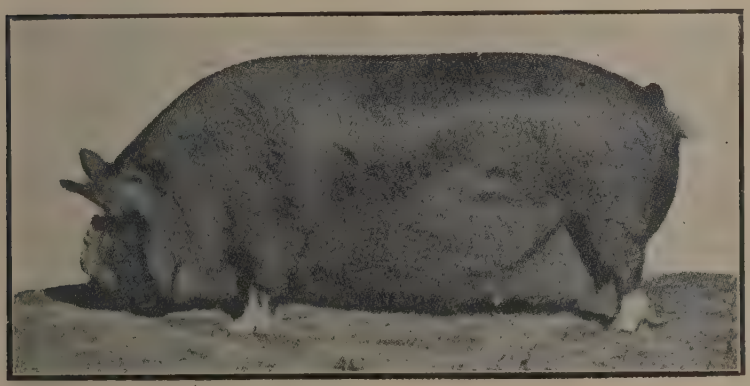
Lot 2 consumed daily 2.00lbs. of corn.

Lot 3 consumed daily 4.40lbs, of corn, or with protein 4.98lbs.

Lot 1 gained .1lb. per day.

Lot 2 gained .15lbs. per day.

Lot 3 gained 1.21 lbs. per day (grew 12 times faster than Lot 1).



A record Fat Pig, sold for £22 15s., on account H. A. College, N.S.W.

Think of the difference between a pen of 10 pigs weighing 573lbs. against 2.260 lbs. at 8 months (1 ton against ¼ ton), and poor quality meat against good quality meat, low price against high price per lb.. 1,446lbs. of concentrated food against 413lbs. for 100lbs. gain. The *balanced* economical saving ration agairst the *unbalanced* expensive and wasteful ration.

A complete balanced ration must contain the proteins and carbohydrates (the main constituents of food) in sufficient quantity and right proportions one with the other, and certain minerals, vitamines, and water. A ration to be a success must be suitable for the animal and be palatable, and to be palatable variety of foods is a big factor. Briefly, a complete balanced ration is a composition of various foods in the right nutritive ratio (protein and carbohydrates) presented in their most attractive form.

The average composition of various foods likely to be used in Western Australia are herewith given to help in apportioning the amount of the food available to balance a ration :—

AVERAGE COMPOSITION OF PIG FEEDS.

Basal Feed per 100lbs.

Name.	Water.	*Protein.* (Flesh, Muscle, Hide, Hoof, Nerve and Bone builders.)	*Carbohydrates (or Starch equivalent).* Fattening Foods.	*Nutrition ratio.* (Rate of Protein to Carbohydrates)
Maize (grain)	14	10	79	1 to 7·9
Barley (grain)	12	12	76	1 „ 6·4
Wheat (grain)	11	12	77	1 „ 6·3
Rye (grain)	12	11	77	1 „ 7·0
Sorghum	13	9	81	1 „ 9·0
Peanuts	8	26	120	1 „ 4·6
Supplementary Feeds.				
Meat meal	70	40	39	1 to 1
Skim milk	90	4	5	1 „ 1·3
Butter milk	90	4	5	1 „ 1·3
Blood meal	9	85	3	1 „ ·04
Soya bean meal	12	33	71	1 „ 2·2
Field peas	10	28	63	1 „ 2·5
Oats (grain)	12	12	78	1 „ 6·5
Pollard (wheaten) ...	11	17	72	1 „ 4·2
Bran (wheaten)	10	16	73	1 „ 4·6
Cotton seed meal ...	8	42	51	1 „ 1·2
Linseed oil meal ...	10	33	60	1 „ 1·8
Lucerne hay, high grade	12	20	62	1 „ 3·2
Lucerne leaves	10	24	57	1 „ 2·4
Clover hay, high grade	12	16	70	1 „ 4·4
Potatoes	79	2	18	1 „ 9
Artichokes	80	2	16	1 „ 8
Sugar beet	83	2	14	1 „ 7
Mangels	91	1	7	1 „ 7
Sweet potatoes	70	2	28	1 „ 14
Apples	82	1	19	1 „ 19

The relative ratio of an average balanced ration for a pig is 1 part protein to 4.5 parts carbohydrates. Maize 1 to 7.9 is what is called a wide ration. Peas 1 to 2.5 is a narrow ration.

Sows with litters and young pregnant sows require narrow rations, as do young growing pigs.

BALANCED RATIONS TABLE.

	Protein.	Carbohydrates.
Sows with litters require feed balanced	1 to	3·5
Pigs 40 to 100 lbs. } Growing and fattening	1 ,,	3·5 to 4·0
100 ,, 150 ,, }	1 ,,	4·5
150 ,, 200 ,, } Fattening	1 ,,	5·0
Up to 200 ,, 300 ,, }	1 ,,	6·5
Boars 300 ,, 500 ,, ...	1 ,,	5·5 to 6·5
Sows (pregnant) 200 to 350 lbs.	1 ,,	5·5
Sows (yelts) 150 ,, 300 ,, ...	1 ,,	5

Let us see how to balance a ration to feed six pigs weighing from 75 to 100 lbs. each.

We want a ratio of 1 of protein to 4 of carbohydrates for such pigs. Foods available, say are wheat, pollard, and skim milk. We look up their compositions.

		Protein.	Carbohydrates.
		lbs.	lbs.
100 lbs. Wheat	equals ...	12	77·5
50 ,, Pollard	,, ...	8·5	36
300 ,, Skim Milk	,, ...	12	15
Total	... ...	32·5	128·5

32·5 ÷ 128·5 = 1 to 3·95 nutritive ratio.

1 part protein to 3.95 parts carbohydrates. Therefore, six pigs would require approximately 12lbs. wheat, 6lbs. pollard, and 3½ gallons of skim milk daily.

The addition of grazing mixed pasture or lucerne completes a well balanced ration.

FEEDING EXPERIMENTS.

The writer has given the results of pig-feeding experiments carried out, taking into consideration feeds that may be available in Western Australia.

SKIM MILK *versus* NO SKIM MILK.

Feeding period 100 *days.*

(Conducted by Prof. John W. Evvard.)

	lbs.	lbs.
Initial weight per pig	42	42
Final weight per pig	155	160
Average daily gain	1·13	1·8
Average daily feed eaten—		
Maize	3·4	3·54
Pollard	·61	·44
Meat meal	·62	·43
Skim milk	None	1·84
Feed required per 100 lbs. gain—		
Maize	299·9	299·70
Pollard	53·5	37·0
Meat meal	54·6	36·0
Skim milk	None	155·80

Briefly stated, 155.8lbs. of skim milk required for 100lbs. gain saved 18.6 lbs. meat meal, plus 16.5lbs. pollard, or 10 gallons of skim milk saved 11.9lbs. meat meal and 10.6lbs. pollard, or at market values the skim milk was worth 5d. per gallon.

BUTTER MILK *versus* NO BUTTER MILK.

	Group 1.	Group. 2
	lbs.	lbs.
Initial weight per pig	150	150
Final weight per pig	296	299
Number of days fed	218 days	156 days
Average daily feed eaten—		
Maize	4·87	2·27
Meat meal	·37	·14
Pollard	·34	·22
Butter milk	None	32·16
Feed required for 100lbs. gain—		
Maize	441	148
Meat meal	33	9
Pollard	31	14
Butter milk	None	209·1

The pigs fed with butter milk made the most rapid gain, and 100lbs. of it saved 14.09lbs. maize, 1.17lbs. meat meal, and 81lbs. of pollard.

LOW GRADE WHEAT *VERSUS* MAIZE FOR FEEDING PIGS.

(CONDUCTED BY KANSAS AGRICULTURAL COLLEGE.)

Feeding Period—120 days.

Number of Lot	1	2	3	4	5
Number of Pigs in Lot	10	10	10	10	10
	lbs.	lbs.	lbs.	lbs.	lbs
Average initial weight per pig	60·4	60·57	60	59·63	59·13
Feed required for 100 lbs. gain—					
Soaked whole wheat	390	...	...	...	...
Ground wheat	...	402	466	245·7	...
Ground rye	...	...	...	245·7	...
Ground corn	...	...	...	...	485
Meat meal	17·85	19·3	...	...	22
Total	407·85	421·3	466	491·4	507
Relative efficiency of rations in per cent. on basis of least feed for 100lbs. gain	100	96·6	87·4	82·9	80·3

No. 1 Lot was fed the most efficiently. Wheat proved superior to maize whether fed with or without meat meal. It was economy to feed proteins, such as meat meal or skim milk: 19.3lbs. of meat meal saved 63.6lbs. of wheat.

BARLEY *VERSUS* MAIZE FOR GROWING PIGS ON LUCERNE PASTURE.

(CONDUCTED BY KANSAS AGRICULTURAL COLLEGE.)

Feeding period—120 days.

Number of Lot	1	2	3	4
Number of Pigs in Lot	9	10	10	10
	lbs.	lbs.	lbs.	lbs.
Average initial weight per pig	37·51	37·47	36·35	37·57
Feed required for 100 lbs. gain—				
Soaked ground maize	506·78	...	...	...
Dry ground maize	...	352·15	...	...
Soaked ground barley	...	...	413·87	...
Soaked whole barley	...	...	...	433·01
Meat meal	28·78	26·17	31·69	32·74
Total	335·56	378·32	445·56	465·75
Relative efficiency of rations in per cent. on basis of least feed for 100lbs. gain	100	88·69	75·31	72·01

Barley did not prove too satisfactory compared with maize in this test. The age of pigs is the principal factor. Barley contains too large an amount of hull for young pigs.

GRAIN SORGHUMS *VERSUS* MAIZE FOR GROWING AND FATTENING PIGS.

Pigs 5½ months old at beginning of Test, fed 60 days.

Lot Number	1	2	3	4
Number of Pigs in lot	5	5	5	5
	lbs.	lbs.	lbs.	lbs.
Average initial weight per pig	99·6	97·87	99·6	99·2
Feed required for 100lbs. gain—				
Ground maize	454·18	...	...	...
Ground feterita (Sorghum)	...	500	...	...
Ground milo (Sorghum)	...	...	507·22	...
Ground kafir (Sorghum)	...	...	...	585·54
Meat meal	18·82	26·64	24·77	26·66
Total	473	526·64	531·99	585·20
Relative efficiency of rations in per cent. on basis of least feed for 100lbs. gain	100	89·81	88·91	80·82

THE VALUE OF DIFFERENT PROTEIN SUPPLEMENTS TO MAIZE AS SHOWN BY A 90-DAY EXPERIMENT.

Lot No. ...	1	2	3	4	5	6
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
Initial weight per pig...	53·5	56·06	55·34	56·4	50·3	56·4
Final weight per pig ...	126·6	152·26	184·34	121·74	139·85	174·66
Daily gain per pig ...	·81	1·07	1·43	·73	9·9	1·31
Feed required to make 100lbs. gain—						
Maize	364·67	297·87	243·00	407·1	269·76	224·21
Protein supplements :						
Meat meal ...	47·20	25·36	19·38	...	...	...
Pollard	...	90·07	94·77	...	82·4	79·95
Semi-solid buttermilk	...	...	53·02	...	...	59·19
Linseed meal ...	...	...	...	65·58	52·03	25·83
Total feed required to make 100lbs. gain	411·87	413·30	410·23	472·68	404·19	389·18
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Cost per 100lbs. gain ...	2 12 7½	2 8 4½	2 9 1	2 15 6½	2 7 6½	2 6 6½
Final value per pig ...	4 14 11	5 14 2	6 18 3	4 11 3½	5 4 10½	6 11 0
Feed cost per pig ...	1 18 6	2 6 7	3 3 10	1 16 7	2 2 3½	2 15 4
Initial cost per pig ...	2 0 0	2 2 0	2 1 0	2 2 0	1 18 0	2 2 0
Margin over initial cost plus cost of feed ...	0 16 5	1 5 7	1 13 5	0 12 8½	1 4 7	1 13 8

Valuation of feeds: maize, 6s. 5d. per bushel; meat meal, £1 2s. 11d. per 100lbs.; linseed meal, 13s. 6½d. per 100lbs.; semi-solid buttermilk, 16s. 8d. per 100lbs. ; pollard, 9s. 4½d. per 100lbs.

AVERAGE DAILY CONSUMPTION OF GRAIN BY VARIOUS WEIGHT PIGS AND AVERAGE DAILY GAIN TO BE EXPECTED.

Weight of Pigs.	Grain Food Daily.	Average Daily Gain.
lbs.	lbs.	lbs
15 to 50	2·3	·76
50 „ 100	3·35	·83
100 „ 150	4·79	1·10
150 „ 200	5·91	1·24
200 „ 250	6·75	1·33

FORAGE CROPS FOR PIGS.

Fodder crops play an important part in feeding pigs if properly supplemented, and their value may be summarised as follows :—

1. Saving of grain and high-priced concentrates.
2. Saving of labour.
3. Increased vigour of pigs, exercise, and digestion.
4. Decreased possibility of disease (parasitic, etc.).
5. Result in more even distribution of manure and destruction of noxious weeds.
6. Permit use of waste land.

A saving of from 10 to 15 per cent. in the total amount of grain feed may be expected through the use of forage crops.

Pasture and fodder crops are of great value to young growing breeding pigs, breeding sows, etc. Green fodders should represent about 10 per cent. of the ration.

Grazing Lucerne.

THE SELF-FED "FREE CHOICE" PIGS ON LUCERNE PASTURE.

Iowa Experiment Station—Growing and Fattening 2½ months old Pigs.

Initial weight 55 pounds; final weight 225 pounds. Feeding period began 6th July. All groups hand-fed twice daily.

Lot No.	Ration Fed.	No. of Pigs.	Days required to reach 225 pounds live weight.	Feed per 100 pounds gain.			Pasture.
				Maize.	Meat meal.	Total.	
				lbs.	lbs.	lbs.	acres.
1	Lucerne—Maize self-fed plus meat meals self-fed; July 6, p.m., to Nov. 4, a.m.	5	121	342·7	31·7	374·4	·018
2	Dry Lot—Maize self-fed plus meat meal self-fed; July 6, p.m., to Nov. 13, a.m. ...	5	130	354·2	50·6	404·8	None

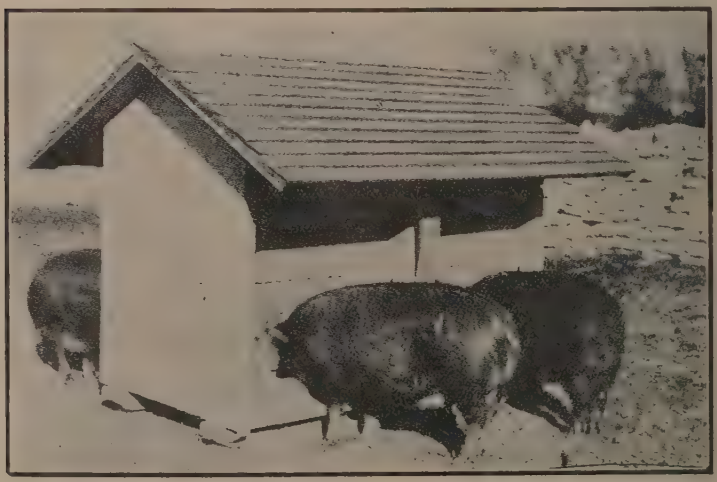
Forage crops for pigs rank in the following order: lucerne, rape, clovers, mixed permanent pastures, barley, rye, soya beans, cow peas, wheat oats.

Lucerne stands pre-eminent as a forage crop for pigs. A good stand of lucerne will carry from 10 to 15 fattening pigs per acre. Rape is easily second—one acre will carry from 5 to 8 fattening pigs. Clovers do exceptionally well in Western Australia and form a most excellent pasturage for pigs.

Feeding off Rape.

SELF FEEDERS.

It is as a labour-saving device that self-feeders are of most value. Self-feeders are very suitable for topping off pigs over from 40 to 60 days. They are not so suitable for breeding pigs, owing to excess of fat induced and the short junky fat pig being developed rather than the lengthy large-framed animal so necessary in breeders. In connection with pasture feeding, self-feeders are very successful. They must receive intelligent attention; they cannot be expected to save all the work. Plenty of water must be close handy to them.



The self feeder working.

Pigs must be brought to a high-eating capacity prior to being transferred to self-feeders. The majority of experiments carried out point to the fact that, while using more feed, results show the greatest gain per pound of feed consumed. Self-fed pigs gain rapidly and economically.

Professor John M .Evvard shows—from experiments—that self-fed pigs, weighing 125lbs. at the beginning of a test for a period of 76 days, gained 2.05lbs. daily, as compared with 1.87lbs. hand-fed pigs (more than 10 per cent. increase), and ate more feed daily, showing that under this system of feeding, pigs work at higher speed. Self-fed pigs require less feed for 100 lbs. gain, or 449lbs. as compared with 469lbs.—a saving of 20lbs. of maize on every 100lbs. gain with young pigs 10 weeks old at beginning of test. Self-fed for 100 days against hand-fed pigs showed with a self-feeder a daily gain of 1.13lbs., and required 408lbs. of feed for 100lbs. gain. The hand-fed pigs gained .59lb. daily, and required 430lbs. of feed for 100lbs. gain. The self-feeder on pasture showed that it took only 120 days to build up 53lb. pigs to 225lb. pigs as against 148 days for similar weight pigs hand-fed.

A cheaply made hinged-door Self Feeder.

SELF-FEEDING *VERSUS* HAND-FEEDING.

(CONDUCTED BY KANSAS AGRICULTURAL COLLERE.

Feeding period—100 days.

	10 Pigs Self-Feeders.	10 Pigs Hand-Feeders.
	lbs.	lbs.
Initial weight per pig	74	79·2
Final weight per pig	256·8	204·3
Gain per pig	182·8	125·1
Daily gain per pig	1·828	1·251
Daily ration per pig—		
Maize	5·95	4·77
Supplement	·32	·47
Feed required to make 100lbs. gain—		
Maize	325·71	381·29
Supplement	17·65	38·13

FEEDING FACTORS.

The principal basal grains in pig-feeding are maize, wheat, barley, rye, sorghum grains. Oats contain rather too much fibre.

Of supplementary foods skim milk stands par excellence—

5lbs. of skim milk equals 1lb. grain in feeding value.

10 gallons of skim milk equals 4lbs. pork: 1 bushel wheat equals 9-10lbs. pork = 14-15lbs.

10 gallons skim milk and 1 bushel wheat *fed together* means 18lbs. pork.

Feed 3 to 4 lbs. of skim milk to each 1lb. of grain.

Meat meal excellent supplementary feed, and is a by-product of lard and grease tanks, dried and mixed with blood.

Linseed oil meal splendid to use in combination with grains, pastures and milk. Do not feed alone; has been known to cause abortion.

Blood meal—dried blood 85 per cent. protein. Small quantities will arrest scours.

Pollard ranks next to skim milk and meat meal for pigs. Bran unsuitable : too bulky and fibrous.

Pig melons very good.

Potatoes good pig feed. Should be cooked. 4lbs. equals 1lb. grain, and makes a good substitute.

On an average it takes 4 to 5 lbs. of cereals to obtain 1lb. gain in weight of pig.

Ground grain shows 8 per cent. saving against unground grain. Soaked grain shows 10 per cent. saving against whole dry grain.

Cooking most foods for pigs shows a loss. Artichokes and potatoes similar in feeding value. Mangels : 8lbs. equals 1lb. cereal grain.

Common salt invigorates digestion. Wood ashes keep down stomach acidity; improves health.

If possible, rations should combine : grain, milk, pastures (or forage crops), meat or fish by-products.

WOOL CLIPS OF THE SOUTH-WEST.

By H. McCallum, Sheep and Wool Inspector, and L. Snook, Cadet.

One of the features of the last series of wool sales in Western Australia has been the fine display of wools from the South-Western portion of the State and the high prices realised for those that were carefully "got up." Despite the fact that it has been conclusively proved that the South-West is capable of producing wool of a type much in demand by wool-buyers, and returning a good profit per head of sheep, the clips from this area as a whole are considered by brokers and buyers to be the most carelessly classed lots submitted for sale. Of course there are farmers in this area whose classing is exceptionally well done, but they are in the minority. Why is this? Why should such a stigma be cast on this corner of our State—a corner that sends some of the finest of all our clips to the warehouses? It has sprung from three causes: —haphazard purchasing, tick-infested flocks, and—above all—negligence in classing. Let us consider the first cause enumerated above: Often the south-west farmer does not run a permanent flock, but buys, as occasion demands, the number of sheep he considers it profitable to pasture. He buys indiscriminately in the sale-yards, and as a result his flock consists not of one uniform type, or anything approaching that ideal, but a miscellaneous collection of numerous varying classes—just sheep. These assorted animals may serve the owner's purpose—the utilisation of seasonal fodder—just as well as a flock of good sheep, but they do not give the same return, nor do they provide an excuse for his sending the wool to the show floor in the condition he does, though the majority seem to think that because the flock is not a first-grade one they should spend no extra time on the clip. Prevention is better than cure, and the farmer's first move should be to buy as even a line of sheep as possible. The "mixed" flock is the root of much evil and makes the classing of a small clip infinitely more difficult.

The "occasional" sheep farmer is also often guilty of owning "ticky" sheep. He purchases (may-be in ignorance) tick-infested animals, and having no facilities for dipping he "lets them rip," especially as he has no intention of retaining them indefinitely. There is nothing more repugnant on the show floors than "ticky wool," and every farmer should make provision to dip his sheep or else make certain that the animals he purchases are clean.

The third and most apparent cause of the ill-repute of the South-West from a wool-broker's viewpoint is the deep, ingrained contempt of many growers for systematic wool classing. The Sheep and Wool Division of the Department of Agriculture and the various firms concerned have for years been spreading the doctrine of wool classing, and the State as a whole shows marked improvement in the "get up" of its clips, but the South-West is still the "Dark Corner." Some of its farmers cannot or will not be taught. It is pitiful to see some of the clips on the floors—lovely wool absolutely spoiled in value by mixing all lines. Good commercial Merino wool rolled up with fleeces from the English breeds of sheep; fleeces with skirtings still attached;

belly wool mixed in with the best fleece wool; and some of the fleeces are just rolled up as they come off the sheep and even tied round with twine. It shows distinct lack of business ability and pride in one's work when clips are sent to market in such a state, besides which there is a decided monetary loss.

The farmers concerned can have no excuse to offer. Even if they still run the mixed flocks previously criticised they should at least keep them free of tick and give a little time and common sense to classing their clip. It takes no experience to learn to keep the coarse crossbred fleeces out of the best merino bale: this, together with the skirting of the fleeces, will effect a big improvement. That this can be accomplished was clearly illustrated in one instance on the show floor last sales. One clip in particular showed out amongst its forlorn neighbours. It was from an ordinary South-West flock and had been "got up" by two young men who—though unversed in the handling of wool—had, by studying up all available literature and using their own judgment, made an excellent job of the classing. Theirs was the gain, for the classing is not merely for the convenience of the buyer, but results in much higher prices for the clips. If the farmers would only make a point of visiting the show floors of the wool warehouses at any time when in town prior to the sales, they could learn a lot and, by comparison of the catalogued lots, their arrangement, and the prices received, would see why their own clips failed to top the market.

1929 is Centenary year. What could be better to commemorate it than for the South-West farmers to determine that their clips will lead the way at the next season's sales, and with this object in view to work right through the present year and consequent shearing, adopting the proven practices of successful sheepmen. It can be done—but will it?

SHEEP MAGGOT FLY PARASITE.

(*Alysia manducator.*)

L. J. NEWMAN, F.E.S., Entomologist.

By arrangement with and through the courtesy of Dr. Guy Marshall, of the Imperial Bureau of Entomology, the Entomological Office received from England on the 24th December last a consignment of parasitised blowfly pupæ.

The material was consigned in cool storage and arrived in excellent condition. From the consignment some 250 parasites issued. These were in turn submitted to locally reared blowfly larvæ or maggots.

The result has been most encouraging, as we have had the pleasure of witnessing the issue up to date of some 180 locally-bred parasites. These in turn have again been worked in the laboratory where they have been put into cages with maggots of two species of blowfly, namely Lucilia sericata, European Greenbottle, and the Australian Greenbottle, Pycnosoma rufifacies.

This parasite is a shiny brownish black wasp, about ¼ inch long. The female lays a single egg in each maggot. This hatches into a legless larva within the body of the fly maggot. Eventually the fly maggot pupates in the soil. Instead, however, of a blowfly issuing capable of laying many hundreds of eggs, the adult wasp cuts its way out of the pupa and is in a day or two ready to lay eggs into other host maggots.

The parasite already established and distributed in thousands, namely, Nasonia brevicornis, attacks only the pupae, whereas the species now introduced attacks the larvae. The advantage is with the latter in that it gets to its host before it has buried itself in the soil.

The Nasonia is at a disadvantage in that it can only get at the pupae which are on the surface or lying under the carcase.

The conbined effect of the two, and other parasites, should they be successfully established, should do a great deal towards controlling this most destructive pest.

It behoves all those interested in the biological control of the blowflies to do all they can to assist the department in the breeding and distribution of these beneficial insects.

As indicating what can be done in this direction, copy of a letter received from Mr. A. Muir, a well known sheep breeder of the Mount Barker and Albany districts, is appended:—

"I saw by the papers that you were again importing some parasites for the Blowfly pest. Curiosity moved me to see what your previous effort had accomplished regarding *Nasonia brevicornis*, so I got some offal and put it out where I could watch the results. It was not long before I saw that the lively little wasp was still about. I am posting to you to-day some chrysalids, or pupae, of the blowfly, so that you can hatch them out and see if they are the same. You may remember the history of these wasps, as some years back you sent me some parasites when I lived at Forrest Hill. I then bred them in an open netted enclosure, adding the carcase of a kangaroo ocassionally to keep them going. I carried this out for over twelve months. We have found the parasites in dead bodies over four miles away from the homestead, so they must distribute themselves very well. When I came to Albany to live I brought some pupae from a dead sheep, got some offal, and bred them up for quite a long time; what I am sending you is the result. It is about two and a-half years since I bothered to see if they were about, so I was pleased to find them still here. Thus you will learn the benefit you have bestowed on the sheep-breeders by introducing those parasites, and, if you find them in what I have sent you, it will convince you that they are very hardy and adapt themselves to the crude conditions of the State.

While at Forrest Hill I distributed them to a great many people, besides breeding them at the other stations at Lake Muir and Warrungup on the Salt River district, so if they have lived, there should be a good spread of them.

Your endeavours to introduce parasites to this State deserve the best recognition possible. See for instance what a help the Chalcid wasp for Woolly Aphis has been to this State, also the Orange Scale parasite and many others."

TESTING MILK BY THE BABCOCK METHOD.

P. C. COUSINS,
Senior Herd Tester.

The Babcock Test was invented by Dr. Babcock of the Wisconsin Agricultural Experiment Station, U.S.A. The process was never patented having been given gratis to the world. In the process, which is both simple and accurate, only one re-agent—Sulphuric acid (1.82 specific gravity) is used).

It is important to know the fat content of milk in order to—

(a) determine the cost of production,
(b) determine the value of individual cows and the herd as a whole, and the elimination of the unprofitable cows.
(c) serve as a basis for the purchase of milk and cream,
(d) check unnecessary waste in skim milk, butter milk and whey.

Apparatus required for Testing Milk.

Babcock Centrifuge Machine
Babcock Milk Test Bottles
17.6 c.c. Milk Pipette
17.5 c.c. Acid Measure
Floating Dairy Thermometer
Dividers for measuring test
Hot Water Bath.

Taking the Sample.

Immediately after the cow has been milked out, the milk should be weighed and the weight recorded. The milk should then be thoroughly mixed by pouring from one vessel to another three times and the sample taken. Two ounces of well mixed milk put into a convenient wide mouthed bottle is a sufficient quantity. When the sample has been standing for some time the cream rises to the surface. The milk should be heated to 90° Fah. and thoroughly mixed. The temperature of the milk when pipetting into the test bottle should be 70° Fah.

Measuring the Milk.

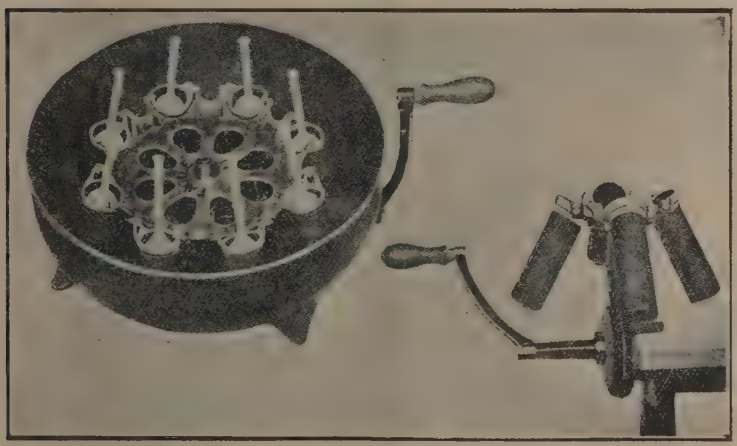
Insert the pipette into the well mixed sample and draw the milk above the mark on the large stem of the pipette. Quickly place the forefinger over the opening of the large stem, and, by releasing the pressure, allow the milk to flow out until the bottom of the slightly curved surface corresponds with the mark. Insert the pipette into the neck of the test bottle and allow it to drain. Blow out the last drop. If the small tube of the pipette cannot be inserted through the neck of the test bottle, hold the bottle at an angle of 60° and allow the milk to flow down the side of the bottle neck. This permits the escape of air from the bottle and so prevents any loss of milk.

Adding the Acid.

Fill the acid measure to 17.5 c.c. mark with sulphuric acid, and, while holding the bottle at an agle, turn it slowly adding the acid in such a way that all adhering milk is washed from the neck. The acid and milk form two

distinct layers and must be thoroughly mixed by giving the bottle a rotary motion, the bottle being kept at an angle during the process to prevent spattering of the contents.

When acid is mixed with the milk it first precipitates the casein and albumen and then dissolves them. The dark brown colour is due to the charring of the milk sugar by the acid. Sulphuric acid aids the separation of fat from the milk serum by (1) overcoming the stickiness of the milk solids and setting the fat globules more free to collect in the neck of the test bottle; (2) by increasing the density of the milk serum; (3) by providing heat.



A Babcock Tester.

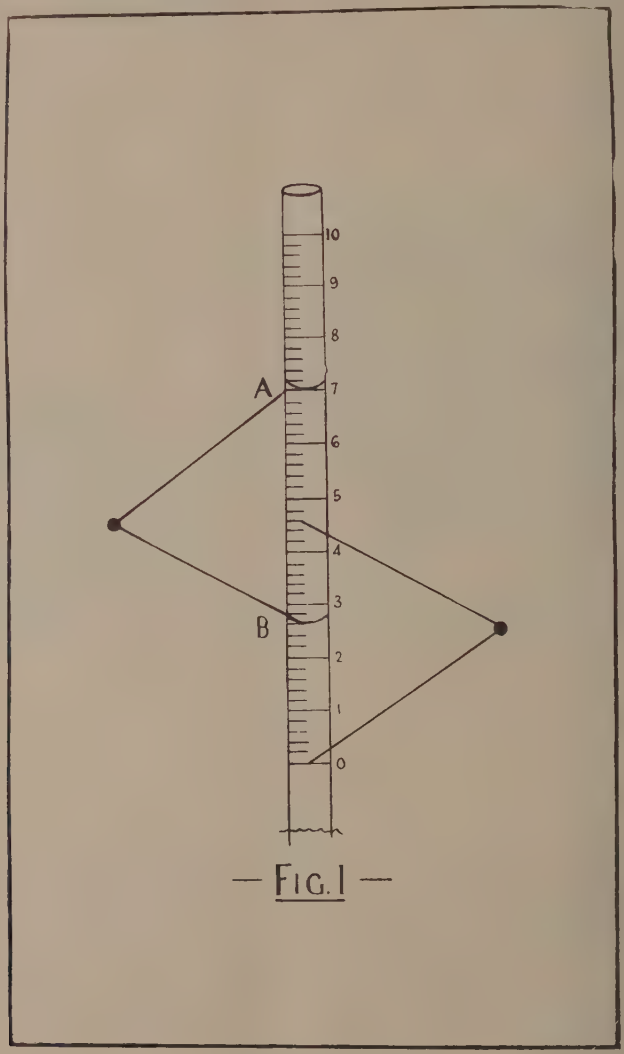
Making the Test.

Place bottles in the tester so that each bottle is counterbalanced by another placed directly opposite in the corresponding cup. Whirl the tester for five minutes at the speed indicated (in the case of four bottle machines the number of revolutions per minute is usually indicated on the handle, and of larger machines on the cover). Add hot water (180 deg. Fah.) to each test bottle, filling it to the base of the neck by allowing it to flow down the side of the neck. Whirl again for three minutes, then add sufficient hot water to bring the fat to the 8 per cent. graduation mark on the neck. Whirl again for two minutes.

Reading the Test.

Remove the bottles from the tester and place them in water heated to 140 deg. Fah. for a few minutes. The depth of the water should be equal to the height of the "fat column" in the bottles. Remove the bottles from the water bath, and, by means of dividers, measure the fat column. Read the lowest point "B" to the highest point "A" as per figure 1. Each large division as 1 to 2 to represents a whole per cent. of fat. Each of the smaller divisions

represents a fifth or two-tenths of a per cent. Suppose the top register seven large and one small divisions, then "A" = 7.2 per cent. If "B" register two large and three small divisions, "B" = 2.6 per cent.; then 7.2 – 2.6 = 4.6 per cent. fat in the milk.



— FIG. 1 —

Centrifugal Action.

The fat is lighter than the milk serum, and, when the milk is whirled in the test bottles, there is a separation of milk fat from the milk serum. The serum goes to the outside of the circle of revolution, while the fat masses in the centre where it is finally collected in the graduated stem. Centrifugal action is well illustrated by whirlpools where all of the foam and light materials, as leaves, collect at the centre.

Factors affecting the Test.

The acid should have a specific gravity of 1.82 to 1.83. Acid should have the same temperature as the milk, i.e., 65 to 70 deg. Fah., and, when added to the milk, should be mixed at once. Acid which is cold or weak fails to dissolve the solids other than fat, and the fat column appears cloudy due to presence of undissolved curd. Acid which is too warm or too strong chars the fat, and the fat column appears dark.

The use of hard water causes foam on the top of the "fat column" due to the action of sulphuric acid on the carbonates in hard water. Preferably distilled water or rain water should be used, but, if this is not available, a few drops of sulphuric acid added to the hard water will overcome the difficulty.

The testing machine must be bedded on a firm foundation, as it is impossible to obtain a complete separation where there is excessive vibration. The speed of the machine must be maintained at the correct number of revolutions per minute for the stipulated time. Operating the machine unevenly or at too slow a speed causes incomplete separation, resulting in inaccurate tests. Excessive speed causes extreme tension on the test bottles which often results in breakages. Accurate results can be obtained only by paying strict attention to detail.

Computing Tests.

Morning and evening milkings should be tested separately, and each sample bottle should be marked with a serial number for identification.

Tests are computed as described below :—

	Milk.	Test.	Butter Fat.	Butter Fat per day.	Butter Fat per month.	Milk per day.	Milk per month.
	lbs.	%	lbs.	lbs.	lbs.	lbs.	lbs.
Morning	17½	x 3·9	·682	1·327	x 30 = 39·81	32½	x 30 = 975
Evening	15	x 4·3	·645				

Date	Name of Cow.	...	No. of Sample.	Milk.	Test.	Butter Fat.	Butter Fat per day.	Futter Fat for sub-period.	Milk per Day.	Milk for sub-period.
				lbs.	%	lbs.	lbs.	lbs.	lbs.	lbs.
30-6-28	Daisy ...	Morning	1	17½	3·9	·682	1·327	39·81	32½	975
30-6-28		Evening	2	15	4·3	·645				

When cows are milked at twelve hour intervals, there is very little variation in the morning and evening tests, usually half of a per cent. under normal conditions. With uneven periods of milking there is a wide variation in test between the long and short periods.

Precautions.

1. Sulphuric acid must be kept in stoppered containers of glass or earthenware and must not be allowed to come into contact with tin or metallic receptacles.

2. If acid is spilled on the hands wash it off immediately with cold water, and if spilled on clothing, rinse immediately with cold water, and then with dilute ammonia water.

3. Do not throw acid waste near plants or where human beings or stock are liable to walk. Acid burns.

4. Should it be neccesary to dilute the acid, pour it into the water stirring all the time. Never add water to acid—it will cause an explosion.

5. Label the acid bottle "Poison" and keep it in a safe place.

THE POLICY OF PRIMARY PRODUCERS IN PURCHASING WEST AUSTRALIAN PRODUCTS PAVES THE PATH TO PROSPERITY.

BUY PLAISTOWE'S

CHOCOLATES, MILK CHOCOLATES, CONFECTIONERY, LEMON PEEL, ICING SUGAR, TRIPLE BLEND COCOA,

AND PLAISTOWE'S FULCREEM BRAND CUSTARD POWDERS, BLANC MANGE POWDERS, DON JELLY CRYSTALS, CAKIES, BAKING POWDER, LEMON SQUASH CORDIAL.

THEIR QUALITY IS UNEXCELLED.

Made in PLAISTOWE'S FACTORY, at PERTH, WESTERN AUSTRALIA.

WEST AUSTRALIAN—Coal, Wood, Milk, Butter, Flour, Eggs and Nuts are used in Plaistowe's Factory.

Insist upon having PLAISTOWE'S when buying.

0—0

SCHOOL LUNCHES.

M. A. Wylie,
Inspectress and Organiser, Domestic Science Classes, Education Dept.

As it is the duty of every person responsible for the feeding of others to seek knowledge and advice on food values, the importance of this article will be realised. The study of food is proving increasingly interesting.

Previous notes in this *Journal* on food have stressed the need of necessary substances to maintain health. Let us again see what they are:—

1. Body building and repair substances—nitrogenous foods and mineral matter—found in meat, fish, cheese, grains, vegetables, fruits and nuts.

2. Energy or fuel substances—starches, sugars, and fats—found in seeds (nuts), tubers, roots, fruits, and vegetables.

3. Vitamins—Nature's tonics, found in small amounts only, and are irregularly distributed among foods in their natural state.

When we remember that all important is the freshness, combination, quality, and quantity of food we prepare for those nearest and dearest it behoves us to give thought to the food question. The freshest and best quality foods contain the most vitamins. The appetite will be a good guide as to the quantity of lunch to cut up. The combination of foods should be studied, as some foods do not digest well when taken together. The old adage, "One man's meat is another man's poison," still holds good.

In most of our schools we find children who are away from home all day —necessitating mothers preparing "school lunch." Knowing that the nutritious school lunch should also be of such a nature as to prevent dental decay, we should eschew those foods which might be placed on the second rate food list—white flour, cornflour, polished rice, tinned goods, preserved meats and fish, sugar, vegetable oils, and some cheeses.

These contain practically *no* vitamins and should be avoided as far as possible. In the process of preparation these foodstuffs have been deprived of their living elements and to some extent of minerals and proteids.

Lunch on these lines is recommended:—

(a) One or two sandwiches, with a savoury filling as meat or fish, egg, grated or thinly sliced cheese, celery and nuts, or sliced apple.

(b) A similar sandwich with butter alone or very thinly spread honey, jam, raisins, marmalade, tomato, dates or figs.

(c) Wheaten meal scones, bran scones or nutbread with butter.

(d) Cocoa if available, milk or water, *not* tea.

(e) An apple or orange. Other fruit in season. Celery.

Note.—Never finish with a cake or biscuit.

Wheatmeal bread is much preferable to white, being more nutritious and less likely to cause dental decay.

Biscuits, chocolates, and sweets should not be taken at the end of a meal. These are prolific causes of dental decay.

Acid fruit, on the other hand, causes an abundant flow of saliva, and when taken at the end of a meal, is a *natural* preventative of dental decay.

A lunch of white bread and jam only is ill-balanced and un-hygienic.

Some points in packing lunches:

1. Every precaution should be taken to keep foods in lunch box or basket in good condition.
2. In hot weather, the use of soft moist food should be avoided.
3. Lunch wrappers, to be obtained now, are useful.
4. Each kind of food should be wrapped up in a separate parcel.
5. In packing, the foods less likely to crush should be placed at the bottom.

In making sandwiches for children leave the crusts on the bread. These need much mastication. The gums are thereby stimulated to send forth copious supplies of saliva, ensuring good digestion.

Egg filling for Sandwiches.

1 hard boiled egg.

½ teaspoon butter.

Pepper and salt to taste.

Any other flavouring to taste, as curry powder, chutney, or marmite.

Some slices of buttered bread.

Method:

Chop egg and mash till well broken up. Mix in butter, seasoning, and flavouring. Spread fairly thickly on bread. Press sandwich before cutting. Cut evenly with a sharp knife.

A Simply-made Cheese (Bath Cream Cheese).

1 gallon new milk, ½ gallon cold pure water. Enough rennet (junket tablet) to turn milk. More rennet is required if milk only is used.
Method:

Place water, milk, and rennet on a wet cloth lining a basin. When curd comes, gather up cloth, and tie up. Hang so that whey can drip into basin. Then pour some water over curd, and tie cloth again. Let whey drip through. When drained, place cloth with curd inside a vessel which it will fill, and put a weight on it. Apply dry cloths for a day or two. Turn cheese out on a plate, cover with another, and turn occasionally. It will be ready for use in a fortnight. Neither salt nor colouring are required.

Wheaten Meal Scones.

Ingredients:

1 cup plain flour.
1½ cups wheaten meal.
1 teaspoon carbonate of soda.
2 teaspoons cream of tartar.
2 ozs. butter.
1 teaspoon sugar.
1 cup milk.
¼ teaspoon salt.

Method:

1. Sift plain flour, rising and salt.
2. Add wheaten flour.
3. Rub in butter.
4. Add sugar and mix to a soft dough with milk.
5. Roll out 1 inch thick and cut in rounds.
6. Bake in a very hot oven 8 to 10 minutes.

Note.—Chopped dates may be added.

Nut Bread.

Ingredients:

1 tablespoon butter.
½ cup sugar.
1 egg.
½ cup chopped nuts.
1½ cups self-raising flour.
½ cup milk.

Method:

1. Cream butter and sugar, add egg and beat well.
2. Stir in nuts and flour.
3. Add milk
4. Put into greased tins (a long tin—such as a cocoa tin). Fill about three-quarters full, put on lid, and bake in a moderate oven about one hour.

Bran Scones.

Ingredients:

1 cup flour.
2 cups bran.
1 cup milk.
1 egg.
1 teaspoon bi-carbonate of soda, dissolved in quarter of the milk.
1 or 2 tablespoons brown sugar.
1 or 2 ozs. butter, ¼ cup treacle or honey.

Method:

1. Beat eggs and sugar together.
2. Add treacle, melted butter, milk and soda.
3. Add flour and bran. Mix well. Roll out.
4. Bake in moderate oven about quarter hour.

LIVE STOCK AND MEAT.

For the information of readers of the "Journal," the following particulars have been supplied by Messrs. Elder, Smith & Co., Limited, Perth:—

COMPARATIVE YARDINGS OF STOCK YARDED AT METROPOLITAN FAT STOCK MARKETS FOR MONTHS OF DECEMBER, JANUARY, AND FEBRUARY, 1927-28.

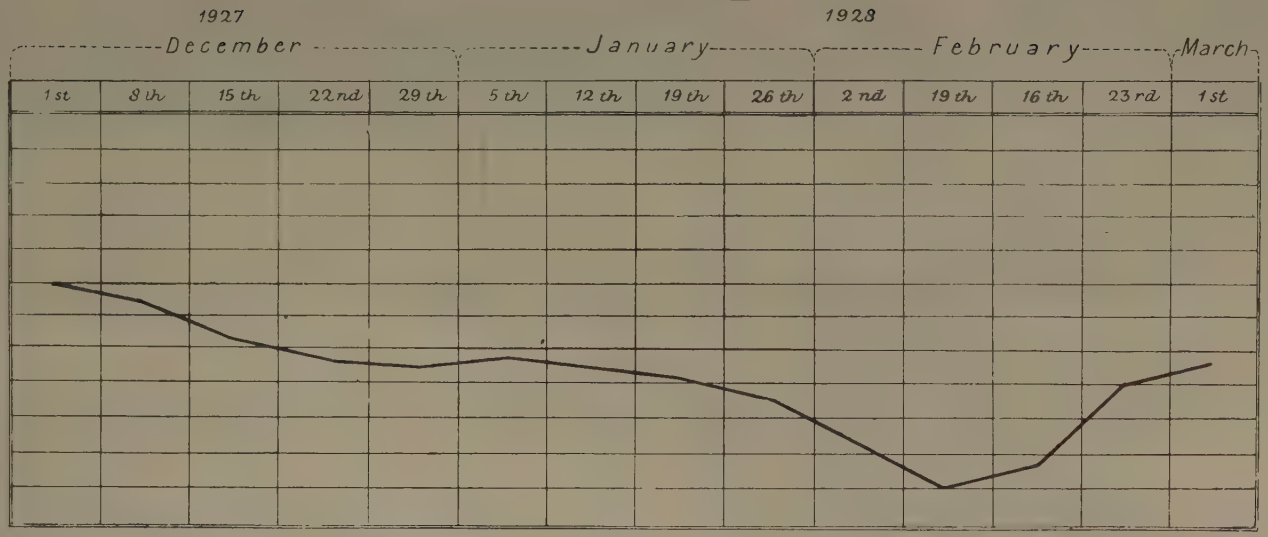
	DECEMBER, 1927.			JANUARY, 1928.				FEBRUARY, 1928.				
	7.	14.	21.	4.	11.	18.	25.	1.	8.	15.	22.	29.
Sheep and Lambs	6,871	10,198	11,698	11,622	8,744	12,456	11,599	10,762	9,174	9,532	9,772	13,292
Cattle ...	880	927	1,156	667	720	731	608	628	742	672	809	791
Pigs	566	896	1,171	528	513	763	585	704	847	934	750	806

COMPARATIVE VALUES PER LB. OF STOCK SOLD AT METROPOLITAN FAT STOCK MARKETS DURING THE MONTHS OF DECEMBER, JANUARY, AND FEBRUARY, 1927-28.

	DECEMBER, 1927.			JANUARY, 1928.				FEBRUARY, 1928.				
	7.	14.	21.	4.	11.	18.	25.	1.	8.	15.	22.	29.
Mutton ...	5½	5½	5½	5½	6	5¾	5¾	5¾	6	6¾	7	6¾
Beef	6	5½	5	5¾	5¾	6	6¼	6¼	6	6¼	6¼	6
Pork	11¾	11¾	10¾	12	12	12	12	11¾	12	12	12	12
Bacon ...	9	9	8	8	9	8¾	9	9	9¼	9¼	9¼	9¼

RETURN OF WHEAT PRICES PER BUSHEL

C.I.F & E LONDON



Compiled from Figures kindly supplied by the Co-Operative Wheat Pool of Western Australia

MARKET REPORT.

The following particulars of the approximate quantity of chaff available for auction at the metropolitan chaff and grain sales, held in Perth during the months of December, January and February; also the minimum and maximum prices ruling for f.a.q. to prime wheaten, have been supplied by Messrs. H. J. Wigmore & Co., Ltd., of Wellington Street, Perth:—

December:
Quantity—1,300 tons.
Maximum price—£5 10s. per ton.
Minimum price—£5 per ton.

January:
Quantity—900 tons.
Maximum price—£5 17s. 6d. per ton.
Minimum price—£5 10s. per ton.

February:
Quantity—1,450 tons.
Maximum price—£5 15s. per ton.
Minimum price—£5 2s. 6d. per ton.

It will be seen from the above that supplies arriving during the last three months have been far from heavy, and this being the case, one would naturally think that prices should have been somewhat higher. The cause of the comparatively low market, we think, is the fact that, according to statistics, a huge quantity of hay has been cut this season, and such being the case, both merchant and farmer do not feel inclined to hold, with the result that the market is weak, and consumers, not anticipating higher prices, are operating only from hand to mouth, competition being consequently extremely dull.

Owing chiefly to the truck shortage, the yarding for January was the smallest recorded for some considerable time, and the market during that month consequently improved, but immediately better supplies were available, it receded, the value of f.a.q. to prime at the time of writing, being £5 2s. 6d. to £5 5s. per ton.

Oaten Chaff: Right throughout the period under review, prime green Guyra oaten chaff has realised a higher price than wheaten of equal standard, f.a.q. oaten selling at about the same price as f.a.q. wheaten.

Oats: Several shipments of first-class quality Algerians have been made to the Eastern States, but during the last few weeks the Eastern markets have eased, and now there is little or no demand from that source. There has, however, been a fairly good local demand and this has helped to keep the market at satisfactory figures, the value of good heavy feed Algerians at time of writing being 3s. to 3s. 3d. per bushel; medium samples, 2s. 9d. to 2s. 10d. There is an excellent inquiry for good, stout lines of all varieties, suitable for seed, and consignments coming to auction would nett very satisfactory figures.

Wheat: The local market has fluctuated in sympathy with London, f.a.q. selling at certain auction during the last day or two at 5s. 5d. per bushel.

Barley: There is some inquiry for good, clean Cape, suitable for seed, at 3s. 6d. to 3s. 9d. per bushel; feed lines, 3s. 3d. to 3s. 4d.

METEOROLOGICAL INFORMATION.

STATIONS.	TEMPERATURE.				RAINFALL.		TEMPERATURE.				RAINFALL.		TEMPERATURE.				RAINFALL.	
	Maximum.		Minimum.		For Month.	Average.	Maximum.		Minimum.		For Month.	Average.	Maximum.		Minimum.		For Month.	Average.
	Mean.	Highest.	Mean.	Lowest.			Mean.	Highest.	Mean.	Lowest.			Mean.	Highest.	Mean.	Lowest.		
	DECEMBER, 1927.						JANUARY, 1928.						FEBRUARY, 1928.					
					inches.	inches.					inches.	inches.					inches.	inches.
Chapman Farm ... State	92·3	106·3	63·8	55·6	·94	·21	93·8	104·2	63·7	55·4	·56	·28	92·3	105·1	63·1	54·9	*Nil*	·52
Geraldton	87·8	108·4	67·5	58·0	·88	·14	85·0	103·0	70·0	56·0	·44	·22	85·5	104·4	65·1	56·2	,,	·30
Walebing	92·6	107·0	62·3	54·0	·14	·47	92·3	106·3	62·3	51·0	·57	·34	91·2	105·2	60·5	51·8	·02	·47
Perth	86·5	105·6	64·0	54·0	·19	·57	85·1	99·7	62·6	52·0	·85	·34	84·3	98·8	61·5	53·8	·01	·45
Kalamunda	86·3	104·0	61·7	48·8	·33	·82	85·8	98·9	59·6	48·0	·87	·54	85·7	97·8	59·2	52·0	·07	·70
Bunbury	83·1	96·2	59·7	51·2	·19	·60	81·5	90·2	58·5	47·4	·58	·44	79·4	87·8	56·8	49·8	·02	·57
Bridgetown	88·2	105·5	54·9	43·0	·16	·80	86·6	103·0	54·0	42·5	1·56	·54	85·7	100·0	50·1	41·2	·05	·66
Albany	73·1	86·4	59·3	50·6	·40	1·16	70·9	80·4	59·1	52·4	2·50	·83	71·7	86·6	57·7	47·4	·12	·96
Merredin Farm State	96·2	104·3	62·1	52·5	·61	·60	90·0	107·1	61·5	47·2	·39	·60	89·7	103·8	59·3	48·2	*Nil*	·57
Northam	93·0	106·0	61·9	52·2	·43	·35	91·7	105·3	61·2	49·8	·57	·28	91·4	103·0	59·9	52·0	,,	·40
York	91·5	106·2	60·5	53·0	·28	·43	90·5	106·8	59·5	48·5	·44	·32	89·9	103·2	58·4	52·0	,,	·47
Narrogin Farm State	87·5	102·4	55·3	47·2	·82	·62	85·8	100·0	54·7	44·5	·53	·33	86·1	99·4	52·9	45·0	,,	·60
Katanning	87·2	101·2	55·9	47·4	·90	·61	83·6	99·3	55·4	48·0	1·06	·36	84·2	98·2	54·2	47·0	·01	·57
Cape Leeuwin ...	72·7	81·0	61·7	58·0	·59	·88	72·5	77·5	61·9	54·8	·96	·69	72·8	81·2	61·7	57·2	·16	·89

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